BUREAU OF HYGIENE AND TROPICAL DISEASES.

TROPICAL DISEASES BULLETIN.

Vol. 29.] 1932. [No. 5.

TROPICAL MEDICAL MYCOLOGY: A REVIEW OF RECENT ARTICLES.

Dermatophytoses. KUROTCHKIN and CH'IN[1] in 118 cases of tinea of the glabrous skin in Peking found onychomycosis present in 18 cases. There were two clinical types: (*a*) the commonest form, characterized by great thickness and brittleness of the nails which were also ridged or otherwise deformed; and (*b*) a form in which the nails remained smooth and had an abnormally dull white colour characteristic of leuconychia. Of the 18 cases 13 showed fungi microscopically and by culture, and the remaining cases in which fungi were not found were of long duration. The fungi found were: *Epidermophyton rubrum*, 9 cases; *E. inguinale*, 1; and *Trichophyton pedis a*, 3. The disease is generally a secondary infection from lesions pre-existing on the hands or other region, is of very long duration and rarely responds to any treatment.

KUROTCHKIN and CHEN[2] studied 100 cases of tinea of the glabrous skin in Peking, and obtained the following results: From 28 cases of tinea cruris 25 cultures were obtained, including 18 of *Epidermophyton rubrum*; 3 of *Trichophyton pedis a*; and 4 of *T. pedis b*. Among 14 cases of tinea of the hands, 9 showed fungi microscopically and by culture, the cultures isolated being *E. rubrum*, 5 cases; *T. pedis a*, 2; *T. pedis b*, 2; and unidentified species, 1. There were 36 cases of tinea of the feet, of which 26 gave positive cultures, including *E. rubrum*, 5; *E. inguinale*, 6; *T. pedis a* and *T. pedis b*, 8 each. Cultures were positive in all of 16 cases of tinea of the body, the fungi found being: *E. rubrum*, 3 cases; *T. pedis a*, 3; *T. pedis b*, 1; *Microsporum ferrugineum*, 4; *Trichophyton violaceum*, 4; and unidentified, 1. Six cases of the disease known as Pompholyx were met with, but no causal organism was found microscopically or by culture and the authors consider that probably the lesions are "epidermophytids" analogous to trichophytids. From these results they conclude that

[1] KUROTCHKIN (T. J.) & CH'IN (T. L.). Tinea of Nails in Peiping.—*Nat. Med. Jl. China.* 1931. Aug.–Oct. Vol. 17. No. 4/5. pp. 534–540. With 7 figs. on 6 plates. [6 refs.] [Peiping Union Med. College, Peking.]

[2] KUROTCHKIN (T. J.) & CHEN (F. K.). Mycological Study of Tinea of the Glabrous Skin.—*Nat. Med. Jl. China.* 1931. Aug.–Oct. Vol. 17. No. 4/5. pp. 521–528. With 12 figs. (11 on 6 plates). [11 refs.] [Peiping Union Med. College, Peking.]

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E. rubrum is the main cause of tinea of the glabrous skin, and is found in all regions, but is most common in the crural area. Tinea cruris may also be caused by *Trichophyton pedis a* and *b*, but they think that these are only varieties of *E. rubrum*. Although *E. inguinale* is the sole cause of tinea cruris in Europe, it was never found in that condition in Peking where it is common in tinea of the feet.

CHEN, KUROTCHKIN, and HU[3] found 18 cases of favus among 410 cases of tinea of the scalp in orphanages in Peking. In most cases the classical clinical appearance was seen, but some cases resembled trichophytosis or folliculitis decalvans. The fungus isolated is considered to be a new variety of *Achorion schönleinii*. Inoculation of guineapigs and white mice with scutula was negative, but with cultures inoculation was positive in 50 per cent. of the animals.

NEGRONI[4] in Buenos Aires in 157 cases of mycoses found the following fungi: *Achorion gypseum*, 2; *A. schönleinii*, 5; species of *Cryptococcus*, 21; *Epidermophyton inguinale*, 8; *E. interdigitale*, 3; *E. rubrum*, 1; *Microsporum felineum*, 26 cases in hair, 13 on glabrous skin and 4 in cats; *M. lanosum*, 5; *Trichophyton acuminatum*, 2; *T. album*, 3; *T. asteroides*, 5; *T. cerebriforme*, 1; *T. depressum*, 1; *T. granulosum*, 2; *T. ochraceum*, 2; *T. plicatile*, 2; *T. radiolatum*, 5; *T. rosaceum*, 2; *T. sulphureum*, 1; *T. violaceum*, 6; undetermined Trichophytons, 4; *Malassezia furfur*, 4; Thrush, 1 case; actinomycoses 8 cases, 2 due to *Actinomyces asteroides*, 1 to *A. madurae* and 5 to undetermined species; *Sporotrichum beurmanni*, 1; American blastomycosis, 2 cases; *Aspergillus fumigatus*, 1; epidermomycoses, 6 cases; onychomycoses, with negative cultures, 3 cases; and *Cryptococcus* sp. in 26 cases of intertrigo. The author notes that the cases of favus were all in immigrants or their children; all cases of *T. violaceum* were in Jews; and that *M. felineum* is the commonest dermatophyte in Buenos Aires.

In other papers[5 & 6] NEGRONI describes a fungus isolated from nail scrapings from patients with onychomycosis and epidermomycosis. According to THOM the fungus is a species of *Cephalosporium*. Guineapig inoculation was negative. NEGRONI attributes a pathogenic rôle to the *Cryptococcus* which, as mentioned above, was isolated from 26 cases of intertrigo. No other fungus was present in the lesions and the same type of culture was given by many different scrapings.

TALICE and MACKINNON[7] in Uruguay from 70 cases of dermatomycoses, mostly from Montevideo, got 23 cultures of *Sabouraudites*, including 2 of *S. gypseus* (Bodin 1907); 1 of *S. equinus* (Bodin 1896); 20 of *S. felineus* (Fox and Blaxall 1896). They consider that *S. felineus* and *S. lanosus* are two strains of the same species; and point out that all the species of *Sabouraudites* are of the animal type, a character which seems to be true of all the néo-tropical zone.

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[3] CHEN (F. K.), KUROTCHKIN (T. J.) & HU (C. K.). Tinea favosa in Peiping.—*Nat. Med. Jl. China.* 1931. Aug.–Oct. Vol. 17. No. 4/5. pp. 529–533. With 7 figs. (6 on 4 plates). [15 refs.] [Peiping Union Med. College, Peking.]

[4] NEGRONI (P.). Statistique de 157 cas de mycose étudiés à Buenos Aires.—*C.R. Soc. Biol.* 1931. Oct. 12. Vol. 108. No. 27. pp. 137–138.

[5] NEGRONI (P.). Nouvelle Mucédinacée parasite de l'homme.—*C.R. Soc. Biol.* 1931. Feb. 13. Vol. 106. No. 5. pp. 386–388.

[6] NEGRONI (P.). *Cryptococcus* sp. isolés de certaines épidermomycoses.—*C.R. Soc. Biol.* 1931. Feb. 13. Vol. 106. No. 5. pp. 389–390.

[7] TALICE (R. V.) & MACKINNON (J. E.). *Sabouraudites* (*Microsporum*) parasites de l'homme en Uruguay.—*C.R. Soc. Biol.* 1931. June 30. Vol. 107. No. 21. pp. 883–884. [Hyg. Inst., Montevideo.]

TALICE and MACKINNON[8] in Uruguay also found 20 cases of trichophytosis among 80 cases of dermatomycoses. The species present were: 4 small-spored, *Ctenomyces mentagrophytes* (Ch. Robin); 3 pure endothrix, 2 *Trichophyton sabouraudi* (R. Blanchard 1895), 1 *T. violaceum* (Bodin 1902); 2 néo-endothrix, both *Trichophyton flavum* (Bodin 1902); 7 large-spored, 3 *T. album* (Sab. 1909), 1 *T. felineum* (R. Blanchard 1895), 3 not cultivated; 2 cases of favus due to *Trichophyton schönleinii* (Lebert 1845); 1 *T. ferrugineum* (Ota 1922); and 1 *T. rubrum* (Castellani 1909). It is noticeable that, as in the case of species of Sabouraudites, the species of Trichophyton belong mostly to the group of animal origin.

CATANEI[9] examined 1,504 children in the Oran region of Algeria and found 46 cases of tinea of the hair, but no tinea of the nails or the glabrous skin. The fungi present were: *Trichophyton violaceum*, 12; *T. acuminatum*, 3; *T. crateriforme*, 1; *T. glabrum*, 12; *Microsporum audouini*, 1. The record of *M. audouini* is the second case in Algeria. Seventeen cases of favus were apparently due to *Achorion schönleinii*. Tinea is commonest between the ages 6 to 10 years and amongst Europeans is most frequent in girls and amongst natives it is probably most common in boys.

AGOSTINI[10] describes a new species of *Bodinia* from the head of a man in Eritrea which he names *B. abissinica*. Inoculation of laboratory animals was negative.

In Peru ESCOMEL[11] investigated various chromatic dermatomycoses and came to the following conclusions: In Peru any patch on the skin is commonly called Kcara, Mancha or Pinta. Scientifically these diseases fall into three groups: (*a*) mycotic kcara, which may be mono- or bi-chromic and occurs in the valleys of the coast; (*b*) mycotic kcara which is polychromatic and may be blackish, bluish, red or yellow, and occurs in the tropical forests of S. Peru; and (*c*) great kcara, or vitiligo, which is achromatic and is not of mycotic origin. The latter may affect the entire skin to such an extent as to alter the racial appearance of the patient and a Negro or Indian may appear white with a characterisitc artificial white tint. It is not rare in newly born infants and is not inoculable from man to man. Spontaneous cure is very rare and treatment to be effective must be commenced very early. It appears to be a disease of alimentary origin among large eaters of maize; and is common in the tropical forests. The treatment of kcara consists in desquamation with acetic acid or dilute trichloracetic acid, followed by application of iodine or mercury, together with internal treatment with organotherapy, especially suprarenal, and arsenical therapy.

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8 TALICE (R. V.) & MACKINNON (J. E.). *Trichophyton* parasites de l'homme en Uruguay.—*C.R. Soc. Biol.* 1931. Sept. 18. Vol. 107. No. 26. pp. 1549–1550. [Hyg. Inst., Montevideo.]

9 CATANEI (A.). Recherches sur les teignes dans la région d'Oran (Algérie). Deuxième observation algérienne de microsporie due à *M. audouini*.—*Bull. Soc. Path. Exot.* 1931. Mar. 11. Vol. 24. No. 3. pp. 177–181. [4 refs.] [Pasteur Inst. of Algeria, Algiers.]

10 AGOSTINI (A.). *Bodinia abissinica* n. sp. provoquant la teigne de l'homme en Erythrée.—*Boll. Sezione Ital., Soc. Internaz. di Microbiologia.* Milan. 1931. Mar. Vol. 3. No. 3. pp. 76–77. [Botanic Inst., & Cryptogamic Lab., Univ., Pavia.]

11 ESCOMEL (E.). A propos des ckara, pinta ou caratés dans le Sud du Pérou.—*Bull. Soc. Path. Exot.* 1931. Mar. 11. Vol. 24. No. 3. pp. 215–222.

THONNARD-NEUMANN, MOYA and BREWSTER[12] examined 75 cases of pinta or carate in Colombia and conclude that it is not of fungus origin, but is essentially of endogenous origin and must be closely related to a spirochaetal disease.

According to DA FONSECA and DA ROSA[13] there have now been 26 cases of keratomycoses nigricans of the palms described in Brazil. They consider that the causal fungus differs from that found in the Orient sufficiently to form the new species *Cladosporium wernecki*; and also consider that the disease produced is different from that described by MANSON in China in 1872 and by CASTELLANI in India in 1905.

Among general papers on ringworm fungi the following are of interest from the medical point of view.

CATANEI[14] describes a pleomorphic form of a culture of *Trichophyton acuminatum* isolated in Algeria. It was constant through animal passage and when inoculated to guineapigs it produced more benign lesions of shorter duration than were caused by the normal cultures. In another paper[15] CATANEI brings together the results of his inoculation experiments on monkeys (*Macacus inuus*) with a number of ringworm fungi. With the endothrix forms, *Trichophyton violaceum* and *T. sulphureum*, he obtained experimental lesions of several months' duration resembling those found in tinea of childhood, the infected hairs being very similar to infected human hairs. The small-spored ectothrix *T. radiolatum* caused tinea in monkeys of at least 4 months' duration with characteristic lesions of the ectothrix type. The large-spored ectothrix species *T. album* gave lesions and parasitized hairs characteristic of this type. *Achorion schönleinii* caused lesions of very long duration characterized by " favus cups " and parasitized hairs such as are found in man. Inoculation of monkeys with *T. glabrum* and *Microsporum audouini* failed. Inoculation with *T. radiolatum* following positive inoculation with *T. violaceum* was positive but the resulting lesions were of less severity and of shorter duration than normal.

OTA[16] discusses the synonomy of Epidermophyton and shows that while this name is generally attributed to LANG the term he introduced was *Epidermidophyton*; and then SABOURAUD in 1909 introduced the name *Epidermophyton inguinale*. Actually this fungus should be called *Blastotrichum fluccosum* (Harz 1871) but OTA does not advise this owing to the great confusion at present existing in the genus. For example, OTA considers that the six new species described by

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[12] THONNARD-NEUMANN (E.), MOYA (J. Camacho) & BREWSTER (K. C.). Is Carate (Pinta) a Dermatomycosis? Clinical Observations in 75 Cases of Carate in Colombia.—*Nineteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1930. pp. 101–106. With 2 text figs. [United Fruit Company Hosp., Santa Marta, Colombia.]

[13] DA FONSECA (O.) & DA ROSA (A. Ferreira). Sur *Cladosporium Wernecki* et la kératomycose nigricans palmaire.—*C.R. Soc. Biol.* 1930. Dec. 19. Vol. 105. No. 35. pp. 785–786. [Oswaldo Cruz Inst., Rio de Janeiro.]

[14] CATANEI (A.). Altération pléomorphique d'une culture de *Trichophyton acuminatum*.—*C.R. Soc. Biol.* 1931. Feb. 13. Vol. 106. No. 5. pp. 343–344. [4 refs.] [Pasteur Inst. of Algeria, Algiers.]

[15] CATANEI (A.). Les teignes expérimentales du singe.—*Arch. Inst. Pasteur d'Algérie.* 1931. Mar. Vol. 9. No. 1. pp. 1–12. With 2 figs. on 1 plate. [2 refs.] [Pasteur Inst. of Algeria, Algiers.]

[16] OTA (M.). Epidermophyton-Epidermidophyton.—*Ann. Parasit. Humaine et Comparée.* 1931. May 1. Vol. 9. No. 3. pp. 277–281. With 1 text fig. [12 refs.] [Dermat. Clinic, Tohoku Univ., Sendai, Japan.]

MacCarthy in 1925 are synonyms of previously described fungi belonging to several different genera.

McCrea[17] found that with *Trichophyton interdigitale* repeated injections of living cultures into guineapigs did not produce any immunity to subsequent inoculation ; and also that injection of various extracts of cultures of this fungus and *Epidermophyton rubrum* failed to produce immunity. Both fungi are readily inoculable to guineapigs causing lesions which appear in about a week and tend to heal spontaneously in about 4 weeks. Reinfection of the same area with *T. interdigitale* was positive three times in succession.

Truffi[18] in experimental mycoses found that when an emulsion of spores of *Achorion quinckeanum* or *Trichophyton gypseum* is injected endocardially a mycotic lesion is always produced at the site of a cutaneous traumatism. The application of chloroform to the skin also induces the formation of a cutaneous lesion at the point of application. In this type of infection (haematic) the hair follicle is the point of fixation of the fungus which later invades the superficial corneous cells and causes typical ringworm lesions. The essential condition for cutaneous lesions to develop after endocardial inoculation is the presence of cutaneous traumatisms or alterations in the walls of the vessels ; and it is not due to tropism or chemotaxis. Mycosis of the internal organs could not be induced although most of the tissues of inoculated animals gave abundant growths of the fungus when removed from the animal.

Ota and Kawatsuré[19] investigated the inoculability and immunology of Endodermophyton in guineapigs. They found that in morphological characters *Endodermophyton tropicale* Cast. and *E. indicum* Cast. are very similar ; and a strain isolated by Miyabara in Formosa appears to be the same species. Consequently the authors unite these species as *E. concentricum* (R. Blanchard 1895) Cast. 1914. *E. raquettei* da Fonseca 1925 is very similar to them also, but is more vigorous and more virulent and, as it was cultivated from a different disease from tinea imbricata it is regarded as a separate species. They found that *E. concentricum* (Miyabara strain) and *E. raquettei* are easily inoculable to man and the experimental infection tends to spontaneous cure. Positive experimental infection with Endodermophyton seems to prevent later infection with the same or different strains of Endodermophyton, and even infection by a more virulent fungus such as *Sabouraudites asteroides.* In experimental infections endodermophytine gives a positive intradermal reaction. They also succeeded in infecting guineapigs experimentally with three strains and in the lesions hairs were invaded in addition to the epidermis. The different strains invaded the hairs in different manners but the differences are regarded as being only accidental phases of growth

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17 McCrea (Adelia). Parasitic Fungi of the Skin.—*Jl. Trop. Med. & Hyg.* 1931. July 15. Vol. 34. No. 14. pp. 204–206. [1 ref.] [Research & Biol. Labs., Parke, Davis & Co., Detroit.]

18 Truffi (Giovanni). Contributo ai problemi delle dermatomicosi sperimentali.—*Boll. Istituto Sieroterap. Milanese.* 1931. Jan. Vol. 10. No. 1. pp. 11–28. With 10 figs. (1 coloured) on 4 plates. [63 refs.] French summary.

19 Ota (M.) & Kawatsuré (Sh.). Inoculabilité au cobaye et immunologie des champignons parasites du genre *Endodermophyton* Castellani.—*Ann. Parasit. Humaine et Comparée.* 1931. Mar. 1. Vol. 9. No. 2. pp. 144–161. With 1 text fig. & 8 figs. on 2 plates. [10 refs.] [Dermat. Clinic, Imperial Univ., Tohoku, Sendai, Japan.]

in the same species of fungus. *E. indicum* Cast. did not infect guineapigs.

LÜCKE[20] working with animal ringworms found that under similar conditions Grütz's medium is as good as Sabouraud's and permits the differentiation of species according to Sabouraud's method. Experimental inoculation of guineapigs with animal dermatophytes nearly always succeeds, the best method being that of BLOCK which is cutaneous inoculation by means of scarification with sandpaper. After recovery from experimental infections guineapigs acquire a conditional immunity. Experimentally infected guineapigs have a complement fixing immune substance of some specificity in the blood. In spontaneous infections of tinea tonsurans in cattle and horses the complement fixation reaction is positive, but it is not specific, and the strength of the reaction has no parallelism with the severity of the disease. The "Hoechst" trichophytine is of no use in the diagnosis of animal dermatomycoses. The author could find no microscopical or cultural confirmation of FAWBACH's work in which the agent of Trichorrhexis nodosa of animals is said to be *Trichophyton equinum.*

In view of the very great increase recently in the incidence of Epidermophytoses of the feet, and the risk of reinfection from slippers, socks and so on, AYRES, ANDERSON and YOUNGBLOOD[21] tried the effect of exposing various fungi to fumigation with a formaldehyde candle. Infective material from lesions and dried material from old cultures of the fungi *Epidermophyton* sp., *Microsporum lanosum* and *Monilia albicans* were killed by 4 hours' exposure to the fumes in a moist room.

CORNBLEET[22] recommends the following reagent as superior to KOH for revealing fungous elements in hairs and scrapings. Preparation: Mix equal quantities of sodium sulphite crystals and 95 per cent. alcohol. The white precipitate which results is redissolved by the addition of distilled water drop by drop until the solution is clear. It is then ready for use. Preferably hairs and scales should be soaked first in ether to remove surface oil, and then mounted in a drop of the reagent.

DOWLING[23] in a review of recent work on the dermatophytes pays special attention to immunity and the mechanism of infection; and also gives an account of his work in transmitting *Trichophyton asteroides* to monkeys and guineapigs (previously summarized in this *Bulletin*, Vol. 28, p. 425).

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[20] LÜCKE (R.). Beiträge zum Studium der tierischen Dermatomykosen unterbesonderer Berücksichtigung der Immunitätsfrage.—Reprinted from *Ztschr. f. Veterinärkunde.* 1930. Vol. 42. No. 6. p. 193 in *Arb. a. d. Reichsgsndhtsamt.* 1931. Vol. 62. No. 4. pp. 573–591. With 3 text figs. [22 refs.]

[21] AYRES (Samuel), Jr., ANDERSON (Nelson Paul) & YOUNGBLOOD (Esther M.). Fumigation as an Aid in the Control of Superficial Fungus Infections.—*Arch. Dermat. & Syph.* 1931. Aug. Vol. 24. No. 2. pp. 283–287. With 2 text figs. [2 refs.]

[22] CORNBLEET (Theodore). A Reagent for demonstrating Fungi in Skin Scrapings and Hair.—*Jl. Amer. Med. Assoc.* 1930. Dec. 6. Vol. 95. No. 23. pp. 1743–1744. With 4 text figs. [Med. College, Univ. of Illinois, Chicago.]

[23] DOWLING (G. B.). Recent Studies of the Dermatophytes, including a Report of Experimental Inoculations of Monkeys (*Macaques rhesus*) and Guinea Pigs with Two Dermatophytes and One Blastomycoides.—*U.S. Nav. Med. Bull.* 1931. Jan. Vol. 29. No. 1. pp. 48–67. [56 refs.]

Moniliasis. BALOZET[24] describes two cases of bronchial moniliasis at Casablanca which are the first recorded in Morocco. The first case was in a male patient aged 28 and simulated tuberculosis but no Koch bacilli were found in the sputum in which yeast cells were numerous. Cultures of *Monilia tropicalis* Castellani 1916 were isolated from the sputum and this fungus seems to have been the principal pathogenic agent. The second case was in a male aged 54 and involved the left lung base. The sputum contained no Koch bacilli but yeast cells and mycelium were present and cultures of *Monilia bronchialis* Cast. 1910 were obtained. In this case the fungus was apparently a secondary infection.

STONE and GARROD[25] undertook serological tests of a number of strains of monilia from various pathological conditions. All strains of monilia from cases of thrush gave identical reactions. Of 14 strains, 12 gave reactions identical with those of *Monilia albicans* of thrush; and of 10 named types of monilias of Castellani, 6 gave reactions identical with *M. albicans*. The serological tests employed were complement fixation and precipitin reaction. For the latter sera were prepared by intravenous injections into rabbits of 5 doses at 5 days' interval of killed saline suspensions of monilia cells from cultures on Sabouraud's agar, the doses increasing from an opacity equivalent of 500 millions to 10,000 millions. The rabbits were bled 10 days after the last injection. Extracts were prepared by emulsifying a Sabouraud's agar slope of growth in 10 cc. of saline, autoclaving for 30 minutes at 15 pounds pressure, and then centrifuging. The supernatant fluid contained abundance of precipitinogen.

SHAW[26] found that different species of Monilia may show morphological differences in the character of growth on dextrose agar, the microscopical appearance of stained slides from these cultures, and in the character of the growth in gelatin stab cultures.

ZEPPONI[27] confirmed CASTELLANI's work that the species *Monilia tropicalis.*, *M. macedoniensis* and *M. krusei* are very similar in morphology but differ in their biochemical reactions.

REIMANN and KUROTCHKIN[28] attempted to produce pulmonary moniliasis in monkeys (*Macacus sinensis*) with cultures of *Monilia tropicalis* isolated from a fatal case of bronchomoniliasis. Infections were made intratracheally, intravenously and directly into the lungs with and without previous or simultaneous injury to the lungs by injection of charcoal, powdered glass, injection of chaulmoogra oil intravenously or direct laceration of the lung tissue. In no case did an infection with Monilia result.

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24 BALOZET (L.). Deux cas de moniliase bronchique.—*Bull. Soc. Path. Exot.* 1931. Jan. 14. Vol. 24. No. 1. pp. 15–17.

25 STONE (Kenneth) & GARROD (L. P.). The Classification of Monilias by Serological Methods.—*Jl. Path. & Bact.* 1931. July. Vol. 34. No. 4. pp. 429–436. [13 refs.] [St. Bartholomew's Hosp., London.]

26 SHAW (Frederick W.). A Morphological Study of the Genus Monilia.—*Zent. f. Bakt.* I. Abt. Orig. 1931. Feb. 3. Vol. 119. No. 7/8. pp. 460–464. With 12 figs. on 1 plate. [11 refs.]

27 ZEPPONI (G.). Some Observations on Certain Species of Monilia.—*Jl. Trop. Med. & Hyg.* 1931. May 1. 3 pp. With 3 figs. on 1 plate. [13 refs.] [Ross Inst., & Hosp. for Trop. Diseases, London.]

28 REIMANN (Hobart A.) & KUROTCHKIN (Timothy J.). Attempts to produce Bronchomoniliasis in Monkeys.—*Amer. Jl. Trop. Med.* 1931. Mar. Vol. 11. No. 2. pp. 151–155. [3 refs.] [Peiping Union Med. College, Peking.]

LIM, KUROTCHKIN and WU[29] investigated experimental bronchomoniliasis in rabbits. They found that intratracheal inoculation of rabbits with cultures of various ages, with or without equal amounts of powdered glass or charcoal, did not produce infection. Similar inoculation of rabbits, the lungs of which were previously injured by the injection of powdered glass, animal charocal or 2 per cent. phenol failed to produce infection. Inoculation following the production of small embolic lesions in the lungs by intravenous injection of liquid paraffin also gave negative results. When stable lesions of the lungs were produced by intravenous injection of chaulmoogra oil, inoculation with Monilia cultures resulted in localized or generalized monilia infections in 13 out of the 23 animals inoculated. The authors consider that this suggests that "primary bronchomoniliasis" in man is dependent on pre-existing active pathological changes in the lungs.

Splenomegaly. The question as to the mycotic origin of splenomegaly was investigated experimentally by REIMANN and KUROTCHKIN[30]. They conclude that siderotic nodules in the spleen are not characteristic of primary splenomegaly as they may be found in other tissues and in other diseases and in some cases may be absent from chronic splenomegaly spleens. The siderotic nodules are not due to the presence of fungi since fungi were cultivated from spleen with no nodules, and in some cases were not cultivated from spleens with numerous nodules; the siderotic nodules have been experimentally produced by the injection of alcohol; and, finally, the filamentous structures found in such nodules are not hyphae of fungi but are degenerated tissue fibres. They sum up the evidence against the mycotic origin of splenomegaly by the statements: different workers have isolated different kinds of fungi; the disease can not be experimentally reproduced in monkeys; and it has not been proved that the fungi isolated were not air borne contaminations.

LABBÉ, BOULIN, BESANÇON and PETRESCO[31] describe a case of splenomegaly in a woman aged 48 in which siderotic nodules, surrounded by haemorrhagic zones, were present. They describe fungal structures in the nodules, but as apparently cultivation was not attempted, there is not sufficient evidence for regarding the disease as being due to a fungus.

Rhinosporidiosis. WELLER and RIKER[32] describe the third case of *Rhinosporidium seeberi* in the United States of America. The patient was a man aged 26 years. The structure of the parasite was found to agree with that described by ASHWORTH in 1922. They point out that 40 or more cases have now been reported from various parts of the world,

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[29] LIM (C. E.), KUROTCHKIN (T. J.) & WU (C. J.). Experimental Bronchomoniliasis in Rabbits.—*Nat. Med. Jl. China.* 1930. Oct. Vol. 16. No. 5. pp. 537–544. With 2 figs. on 1 plate. [3 refs.] [Peiping Union Med. College, Peking.]

[30] REIMANN (Hobart A.) & KUROTCHKIN (Timothy J.). The Relationship of Fungi to Chronic Splenomegaly of Unknown Origin.—*Amer. Jl. Med. Sci.* 1931. Jan. Vol. 181. No. 1. pp. 107–114. [15 refs.] [Peiping Union Med. College, Peking.]

[31] LABBÉ (Marcel), BOULIN, BESANÇON (J.) & PETRESCO. Un cas de splénomégalié mycosique.—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1931. May 4. Year 47. 3rd Ser. No. 14. pp. 659–662. [1 ref.]

[32] WELLER (Carl Vernon) & RIKER (Aaron D.). *Rhinosporidium seeberi*: Pathological Histology and Report of the Third Case from the United States.—*Amer. Jl. Path.* 1930. Nov. Vol. 6. No. 6. pp. 721–731. With 13 figs. on 6 plates. [19 refs.] [Path. Dept., Univ. of Michigan, Ann Arbor, Mich.]

3 in U.S.A., 3 from Argentine, and most of the remainder from Southern and Western India and Ceylon, and that in all cases the organism seems to be the one species, *R. seeberi*. All these cases have been in males ranging from 10 to 60 years of age; and the locations include the anal region, conjunctiva and lacrymal sac, uvula and penis. All animal inoculations have been negative and the mode of infection is unknown although autoinfection clearly takes place.

KURUP[33] described the first case of rhinosporidiosis in a woman. The patient was a Mohammedan and the condition was of 8 years' duration. It consisted of a pharyngeal tumour arising from the nasopharynx. In the same paper a case of rhinosporidiosis occurring as a growth on the eyelid of a boy aged 12 is described.

Mycetoma. DELAMARE and GATTI[34] briefly describe a case of black-grained mycetoma of the foot of six years' duration. Cultures of a hyphomycete were easily obtained and will be described by the authors in another paper.

CATANEI and LEGROUX[35] published the second case of mycetoma of the lung in Algeria. The patient was a European woman aged 36. The first tumour appeared on the posterior arc of the ninth rib and was followed by five more over a period of several months. In spite of local and general treatment the disease continued to extend. Small greyish-white, soft grains, without clubs, were present, and from them *Cohnistreptothrix israeli* (Kruse 1896) was isolated. Inoculation of guineapigs and rabbits with cultures in various ways was negative. Inoculation into the gum of a monkey resulted in a tumour which was resorbed in 3 weeks. Subcutaneous inoculation of a mouse gave a local abscess.

A case of actinomycosis of the jaw in Algeria is described by MONTPELLIER, CATANEI and LEFRANC[36]. Yellowish-white grains were present from which cultures of *Cohnistreptothrix israeli* were isolated. Potassium iodide in progressive doses of 2 to 8 grams a day for a month resulted in definite improvement.

The same fungus *C. israeli* was found in two cases of actinomycosis in Greece by JOANNIDES, PAPAGHEORGHIOU and ANGELO[37]. These authors consider that this fungus is the sole cause of human actinomycosis.

BREITLÄNDER[38] describes the first four cases of actinomycosis in

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[33] KURUP (P. K.). *Rhinosporidium kinealyi* Infection.—*Indian Med. Gaz.* 1931. May. Vol. 66. No. 5. pp. 239–241. With 4 text figs. [1 ref.]

[34] DELAMARE (G.) & GATTI (C.). Mycétome du pied à grains noirs.—*Bull. Soc. Path. Exot.* 1931. Feb. 11. Vol. 24. No. 2. pp. 80–84. With 3 text figs. [Med. Clinic, Faculty of Med., Ascuncion.]

[35] CATANEI (A.) & LEGROUX (Ch.). Etude d'un cas d'actinomycose pleuro-pulmonaire observé en Algérie.—*Bull. Soc. Path. Exot.* 1931. Feb. 11. Vol. 24. No. 2. pp. 85–88. [3 refs.] [Pasteur Inst. of Algeria, Algiers.]

[36] MONTPELLIER (J.), CATANEI (A.) & LEFRANC. Un nouveau cas d'actinomycose de la face observé à Alger.—*Bull. Soc. Path. Exot.* 1931. June 10. Vol. 24. No. 6. pp. 431–432. [2 refs.] [Lab. of Path. Anat. Faculty of Med. & Pasteur Inst. of Algeria, Algiers.]

[37] JOANNIDES (G.), PAPAGHEORGHIOU (S.) & ANGELO (A.). Chronique de l'actinomycose en Grèce.—*Bull. Soc. Path. Exot.* 1931. June 10. Vol. 24. No. 6. pp. 432–433. [6 refs.] [Red Cross Hosp. & Hellenic Pasteur Inst., Athens.]

[38] BREITLÄNDER (K.). Aktinomykose in Südchina.—*Arch. f. Schiffs- u. Trop.-Hyg.* 1931. May. Vol. 35. No. 5. pp. 273–278. With 4 text figs. [Canton Sanatorium, Canton, China.]

China, 3 in Chinese and 1 in an Indian. The first case involved the thigh, and was cured by large doses of KI. The second occurred as an abdominal abscess following an operation for appendicitis, and was cured by KI and deep Röntgen rays; and the same treatment was effective in the third case which involved the maxilla. The fourth case involved the lung and breast and treatment with iodide, small doses of neo-salvarsan and Röntgen rays gave a temporary improvement followed by relapse.

In Rio de Janeiro DA FONSECA[39] isolated *Aspergillus amstelodami* (Mangin) from a true case of mycetoma of the foot. The paper contains a detailed description of the fungus; and a lengthy discussion of the classification of the *glaucus* group of the Aspergilli. The grains from which the cultures were obtained were roundish, hard, covered with small protuberances, sulphur coloured and had a maximum size of 1 to 1·5 microns in diameter.

Coccidioides. DA FONSECA[40] in a general review on *Coccidioides immitis* describes, following an historical account, the morphology and spore formation of the parasite, the cultures, and the results of animal inoculation. He concludes that the visceral lymphatic form of the disease is not uncommon in Brazil. As regards the serological reactions, the agglutination test is negative. Complement fixation is said to be positive by some workers, to be negative by others, and to be a group reaction by still others. The intradermal reaction is positive. Only about six cases of recovery from the disease are known.

Parr Tate.

MAZZA (Salvador) & DE LOS RIOS (Miguel). Sobre un caso de moniliasis vaginal.—*6a Reunión Soc. Argentina Patol. Regional del Norte, Salta, 29 y 30 septiembre y 1 octubre, 1930.* pp. 215–225. With 13 text figs. & 1 coloured plate. [4 refs.]

MAZZA (Salvador), NIÑO (Flavio L.), QUINTANA (Hector) & BERNASCONI (Vicente). Blastomicosis grave generalizada por *Monilia* n. sp.—*6a Reunión Soc. Argentina Patol. Regional del Norte, Salta, 29 y 30 septiembre y 1 octubre, 1930.* pp. 180–214. With 38 figs., 1 chart & 5 plates (3 coloured). [4 refs.]

NIÑO (Flavio L.). Onicomicosis generalizada de origen penicillar.—*6a Reunión Soc. Argentina Patol. Regional del Norte, Salta, 29 y 30 septiembre y 1 octubre, 1930.* pp. 27–34. With 8 figs. & 1 plate.

NIÑO (Flavio L.). Consideraciones diagnósticas acerca de la propagación al aparato respiratorio de la blastomicosis de Gilchrist.—*6a Reunión Soc. Argentina Patol. Regional del Norte, Salta, 29 y 30 septiembre y 1 octubre, 1930.* pp. 168–179. With 16 figs. [18 refs.]

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[39] DA FONSECA (O.). Mycetoma by "Aspergillus Amstelodami."—*Rev. Med.-Cirurg. do Brasil.* 1930. Dec. Vol. 38. No. 12. pp. 424–430. With 2 figs. on 1 plate.

[40] DA FONSECA (O.). Besonderes Studium des *Coccidioides immitis* und des coccidioidischen Granulomas.—*Seuchenbekämpfung.* Vienna. 1930. Vol. 7. No. 4. pp. 237–250. With 6 text figs.

MALARIA.

BARBER (M. A.) & OLINGER (M. T.). **Studies on Malaria in Southern Nigeria. With an Appendix by** PERSIS PUTNAM.—*Ann. Trop. Med. & Parasit.* 1931. Dec. 31. Vol. 25. Nos. 3 & 4. pp. 361–501. With 3 figs. & 1 map. [7 refs.]

The majority of these observations were made in the coastal town of Lagos and the neighbouring villages. As the result of the examination of a single thick film, 61 per cent. of 6,838 men, women and children were found to have parasites in their blood; 13·3 per cent. had crescents, 22·6 per cent. had quartan parasites. The parasite index was relatively low in infants up to 4 months, it then rose rapidly and reached a maximum of 98·2 at 3 years; subsequently it fell slowly until the age of 16, and then dropped to 48·6 per cent. The percentage of crescent infections fell from above 25 per cent. in children under 4, to about 8 per cent. in older children and adults. The total percentage positive, 61·4, is far below that of the population in general, because a disproportionately large number of persons in the least infected age groups was included. The heavier crescent infections were commonest in infants, rare at four years and absent in older persons. The index of quartan was low in infants, rose to a maximum at 4 years, and then declined slowly, but remained fairly high even in adults. There was little evidence of a racial immunity, except possibly in the low infection index shown by infants 4 months old or younger. Anaemia was relatively higher in infants and young children, but the authors think that this anaemia is less than among white children equally parasitized.

At the time of examination clinical symptoms among infants seemed to be generally lacking, whether the infant was malaria positive or not. Nine infants died out of 268 who were under observation for 8 months. "Africans of this region never acquire a complete tolerance. . . . With regard to the question of racial tolerance . . . comparison with other races equally exposed to infection and equally well nourished is necessary to a decision."

A form of *A. costalis* (= ? var. *melas*) with very dark brown larvae and dark adults, some of which have the four-banded proboscis, occurs plentifully in the swamps surrounding Lagos. The average anopheline density in native houses was 5·1; the percentage infected, of 15,144 examined, was 12. The highest rate of infection—25·5 per cent.—occurred in September.

A. funestus is comparatively rare in the coastal districts, but is common in Ibadan, inland. *A. hargreavesi* and *A. moucheli* are also plentiful in Southern Nigeria and have a high infection rate. *A. costalis* will disperse at least half a mile from a large breeding place, and probably much farther. A very low adult density of this species seems to be adequate to keep up a high malaria rate. *A. costalis* is very uncommon in the large semiwooded swamps near Lagos. Anti-larval measures are especially difficult where these mosquitos abound, because they are adapted to a great variety of breeding places and their development is very rapid, thus enabling them to take advantage of temporary water. "We doubt if any larvicidal 'campaign' can alone cope with conditions found in West Africa."

W. Fletcher.

HENDERSON (L. H.). **Some Observations on the Incidence of Malaria amongst the Nilotic Tribes.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1932. Jan. 30. Vol. 25. No. 4. pp. 281–286.

The Nilotic tribes inhabit the Upper Nile Province of the Sudan, a marshy plain embracing the White Nile; they number about half a million. Malaria is chiefly benign tertian, with a few isolated foci of quartan; at government posts and trading stations subtertian occurs which has been introduced by Arabs from the north. Practically every child contracts malaria repeatedly and the infant mortality is very high; only the fittest survive, and it is rare to see any but sturdy children over 4 years old. Attacks recur frequently up to the tenth year, but by the age of 16 they are rare, and in adult life they only occur in those persons with some other debilitating disease. The average splenic index of children is 50 per cent., but for male adults it is only 0·05. In places where the splenic index of the children is lower, there is less immunity in adult life and therefore the adult index is higher. Near government posts, where the children are given quinine, there is also more malaria among adults. This immunity is specific for benign tertian malaria, and does not protect against subtertian or quartan. With repeated exposure to quartan during childhood, a similar specific immunity is produced, but this does not occur with subtertian.

W. F.

SERGENT (Edmond), SERGENT (Etienne), PARROT (L.), FOLEY (H.), CATANEI (A.) & SENEVET (A.). Carte du paludisme en Algérie. [**Map of Malaria in Algeria.**]—36 pp. With 28 text figs. & 2 folding maps. 1928. Algiers: Gouvt. Général de l'Algérie. Direction de l'Agriculture, du Commerce et de la Colonisation. Service Cartographique. (Jules Carbonel, Printer.)

This well-produced report gives an outline of the biology of the malaria parasite, and the way in which it is carried from man to man. It contains very clear maps showing the distribution of malaria in the country, and some excellent photographs of breeding-places, drainage, and the like. It is evidently intended for the use of the government administrators.

When France occupied the country about 100 years ago it was desolate and uncivilized, a condition which the authors attribute to its endemic malaria. A French general of that day referred to it as a barren rock where it was necessary to import everything except air, and even that was bad. Things are very different now, for with the help of the plough and quinine the colonists have changed the face of the country and malaria yields step by step to civilization; but it has not been "stamped out," and in certain zones it becomes epidemic.

The malaria charts in this report have been prepared from the figures of the splenic and parasitic indices collected over a number of years. Roughly speaking, the coastal regions in the north are the most malarious, and the disease diminishes as one proceeds south towards the Sahara, but a healthy district is often found alongside one that is malarious. The unhealthy places are invariably near water, such as rivers and swamps. Taking the villages of the coastal zone as a whole, the splenic index is about 36, and the parasite index is 11. This is in the spring, among native children 1 to 15 years old.

The principal anopheles are: (1) *A. maculipennis* which breeds in clear, stagnant, or slowly moving water containing weeds. (2) *A. algeriensis* which breeds in the same kinds of places, but is more common in the cooler, more mountainous parts. (3) *A. hispaniola* which is sometimes found along with *A. maculipennis* at the bottom of cliffs near the sea, but is more common in pools among the rocks in the northern Sahara. (4) *A. sergenti* is closely related to the last, and its breeding places are similar. (5) *A. multicolor* belongs essentially to the Sahara. It can live in water concentrated by evaporation, and richer in salt than the sea. Excellent photographs are given showing the breeding places of these various species.

W. F.

MATHEW (K. C.). **Report on Mosquitoes and Malaria at Aldabra and Assumption Islands.**—*Seychelles Ann. Rep. on Med. Dept. for Year 1930.* pp. 15–18 & Appendix J. pp. 51–53.

Aldabra Island is an atoll 24 miles long, 630 miles from Mahé the principal island of the Seychelles Archipelago. There are about 100 people on the island, and the staple industry is fishing and turtle catching. Assumption is an elevated coral reef about 20 miles away from Aldabra. Anopheles had never been found in these islands, though an outbreak of malaria occurred in Aldabra during the spring of 1908, and benign tertian parasites were found at the time. Labourers are imported from Madagascar and elsewhere already infected; but it has generally been supposed that the disease did not spread because there were no anopheles. Epidemics of fever, however, were reported to have occurred in July 1929 on Assumption, and in October on Aldabra, and in January 1930, these islands were visited by Dr. K. C. Mathew. The epidemic in the island of Assumption had come to an end four months before his visit, and he found no malaria parasites, no enlarged spleens, and no anopheles; consequently it is uncertain whether the epidemic was due to malaria or to some other disease. In Aldabra, on the other hand, there were several people with fever, many of whom had never been outside the colony during the course of their lives, and he found malignant tertian parasites in them all. Furthermore, on searching the pools with which the islands abound during a part of the year, he discovered the larvae of anopheles. The coral formation of the island, with its hard surface and innumerable little pits, would make antilarval measures both difficult and costly. Specimens of the anopheles were sent to London for identification.

W. F.

MACDONALD (G.) & MAJID (Abdul). **Report on an Intensive Malaria Survey in the Karnal District, Punjab.**—*Records of the Malaria Survey of India.* 1931. Sept. Vol. 2. No. 3. pp. 423–480. With 1 graph in text. [10 refs.]

The observations were made on villages within 20 miles of Karnal City, in the south-east of the Punjab. The district forms part of the vast alluvial plain below the Himalayas, and appears to be absolutely flat and level. Irrigation of almost all crops is necessary. The old Western Jumna Canal constructed by the Moghul emperors formerly ran a tortuous course through the district, and interfered with natural drainage; it gave rise to swamps and caused malaria until the canal

was re-aligned in 1885, after which the district become relatively healthy. The principal carrier is *A. culicifacies*, and the most dangerous breeding places are the grass-grown distributaries leading from the Jumna canal, shallow grassy swamps formed by seepage from the main canal where it runs at a higher level than the surrounding land, farm tanks, and pools by the side of roads which obstruct drainage. In years in which the rainfall is normal or subnormal, the two factors influencing the severity of malaria are the proximity of *culicifacies* breeding places, and the severity of the last autumnal epidemic; presumably because of the greater number of gametocyte carriers.

W. F.

RICHMOND (A. E.). **The Relation of Meteorological Conditions to Malaria Incidence amongst British Troops in Peshawar.**—*Records of the Malaria Survey of India.* 1931. Dec. Vol. 2. No. 4. pp. 621–642. With 17 charts. [2 refs.]

Humidity is the most important factor influencing the incidence of malaria amongst troops in the non-monsoon area of the North West Frontier Province. Bad years are characterized by one or more ten-day periods between July 29 and August 28 with an average humidity of over 80 per cent. All the years with higher incidences of malaria are characterized by at least one ten-day period with average humidities of over 75 per cent. before August 18.

W. F.

IYENGAR (M. O. T.). **The Distribution of *Anopheles ludlowii* in Bengal and its Importance in Malarial Epidemiology.**—*Indian Jl. Med. Res.* 1931. Oct. Vol. 19. No. 2. pp. 499–524. With 4 maps & 1 chart in text & 4 figs. on 2 plates. [5 refs.]

A. ludlowii, Theobald, is a Far Eastern species which has but a limited range of distribution in India where it is found only in the Andamans, Lower Burma, and Lower Bengal, and for this reason malariologists in Bengal have considered it to be of little importance. The author's investigations show that it has a much wider distribution in Bengal than is commonly supposed, and that it is very numerous in some areas: in view of this, and of its high susceptibility to infection, he urges that it should be recognized as an important transmitter in the province. It occurs in coastal districts, but may also be found a hundred miles inland along the banks of tidal rivers. It appears to be spreading, and the isolated foci of *A. ludlowii* on the banks of the Hooghly are probably the result of recent colonization, for these places have suddenly become intensely malarious, while the surrounding country, where there are no *A. ludlowii*, remains healthy. River-boats and trains probably play an important part in transporting mosquitoes: on one occasion the author caught a specimen of *A. ludlowii* near a railway station in a district where this mosquito did not occur. *A. ludlowii* is not found in the mangrove covered swamps along the banks of the rivers, but when the forest is cleared for agricultural purposes and the land is bunded in order to keep out the high tide, it breeds freely in the brackish pools which form in the low-lying ground. Photographs are given, showing a river with cleared and bunded land on one bank, where *A. ludlowii* breeds freely; on the other bank there is dense mangrove jungle, and *A. ludlowii* is not to be found. During the autumn of 1930, a severe

epidemic occurred in an industrial area on the left bank of the Hooghly. The incidence of anophelines in the houses was very high, and *A. ludlowii* was so numerous that it exceeded the others many times over. There were very few of these mosquitoes in villages a mile away, and their inhabitants were unaffected by the epidemic. The optimum salinity for the breeding of the *A. ludlowii* of Bengal is about 0·4 per cent., which is only one third of that of the *A. ludlowii* of the Dutch East Indies.

W. F.

MACDONALD (G.). **Report on a Malaria Survey in Bikaner State.**—*Records of the Malaria Survey of India.* 1931. Dec. Vol. 2. No. 4. pp. 603–619. With 1 graph. [4 refs.]

Bikaner City is the capital of the northernmost state in Rajputana. It is on the border of the great Indian desert, and is very dry; the average rainfall is 11·8 inches, but most of it falls in isolated storms; the subsoil water level is 350 to 385 feet below ground; in spite of this, grasses spring up after good rain and there is some cultivation. As water is so scarce it is conserved in tanks and cisterns. The normal mean monthly humidity never quite reaches 70 per cent., but it remains about 65 per cent. for three months; therefore the transmission of malaria is only just possible. The spleen rate is only 1·1. The carrier is *A. stephensi*, which breeds in the tanks and cisterns. Outside the town, there are two palaces, by the side of an artificial lake. There is much more malaria there than in the town; the spleen rate was 19 per cent. and both *A. stephensi* and *A. culicifacies* were caught in the servants' quarters. The lake raises the relative humidity, and provides breeding places.

W. F.

COVELL (G.) & BAILY (J. D.). **Malaria in Sind. Part IV. Malaria in Nawabshah District. Part V. Malaria in Umarkot and Chhachhro Talukas of Thar and Parkar District (Lower Sind). Part VI. Post-Epidemic Conditions in a Rice-growing Area in Kambar Taluka, Larkana District. Part VII. Malaria in the Upper Sind Frontier District.**—*Records of the Malaria Survey of India.* 1931. Dec. Vol. 2. No. 4. pp. 507–526. With 1 map. [3 refs.]; 527–536. [4 refs.]; 537–543. [4 refs.]; 545–568. [2 refs.]

These papers continue the series on malaria in Sind [see this *Bulletin*, Vol. 28, pp. 106 and 578], and demonstrate the different conditions met with in different parts of the country and the influence of irrigation. Thus at Jacobabad, with average rainfall of 3 inches per annum, the splenic indices were 70–80; here as elsewhere *A. culicifacies* is the usual carrier.

A. G. B.

SCHARFF (J. W.). **The Singapore Cold Storage Dairy Farm in its Relation to Antimalaria Control Measures.**—*Malayan Med. Jl.* 1931. Sept. Vol. 6. No. 3. pp. 82–87. With 5 figs.

This is an example of the adaptation of permanent antimalaria drainage to serve as a water supply. The farm site comprises an area of 55 acres consisting of fertile ridges intersected by steep ravines,

with granite outcrops here and there. One of the reasons for the choice of this site was the abundant water present in the form of springs and seepages, but it would have been difficult to find a place more potentially malarious. When jungle clearing began, there was such a serious outbreak that the scheme could not have been carried out unless antilarval measures had been adopted. "The dramatic disappearance of malaria is certainly due to the fact that it was possible to eradicate rapidly and completely within the half mile zone of the farm all breeding place of the dangerous mosquitoes." Temporary oiling was employed until the permanent drainage was completed. The permanent drainage was effected by means of 5 inch subsoil pipes, laid at an average depth of 5½ feet. These pipes lead into an underground reservoir from which water is pumped into a service tank for farm use; it is of excellent quality, and, even in dry weather, the amount available is no less than 75,000 gallons daily. The sides and floors of the ravines are now quite dry, and are to be planted with kikuya grass which has been imported from Australia on account of its spreading and clinging properties.

A most interesting discussion followed this paper. Dr. SELWYN-CLARKE, the Chief Health Officer of the Federated Malay States, said that though the value of subsoil drainage in urban areas was fully appreciated, there appeared to be good grounds for believing that contour drainage and oiling were better suited to rural areas. In support of his contention he instanced the case of a rubber estate on which a system of subsoil drains was constructed by the government antimalaria engineer in 1916-1925. This was a failure, and the system was reconstructed in 1926–27, only to fail once more, at a total cost to the government (apart from the contribution of the estate) of $40,000, or £4,600. "Objections to subsoil drainage on estates included high capital cost, high maintenance charges (4 per cent. to 6 per cent. annually) the sacrifice of 5 per cent. to 10 per cent. of the planted area and the need for skilled supervision."

The next speaker, Dr. MACAULEY, who has had more than twenty years' experience of the Malay States, agreed that open drains and oiling were more satisfactory on estates than subsoil drainage. Dr. MACASKILL, with an equally long experience, also agreed in the main, but suggested the use of subsoil pipes at the heads of ravines in order to prevent the scouring away of the soil in heavy rain.

Dr. Scharff said in reply that "though he was an advocate of subsoil drainage near towns and large villages in Malaya, yet he did not think that subsoil drainage was as a rule applicable to estates unless some additional object could be served such as had been achieved at the Cold Storage Dairy Farm." [Many miles of subsoil drains have been buried in the rubber estates of Malaya. Up to a few years ago, local opinion was so much in favour of this form of drainage that few dared to question its infallibility and one would like to know the reason for this rather sudden change.]

W. F.

SAMUELS (W. F.). **Anti-malarial Work at the Central Mental Hospital, Tanjong Rambutan, Malaya.**—*Jl. Mental. Sci.* 1931. July. Vol. 77. No. 318. pp. 555–561.

This is a good example of malaria caused by clearing away undergrowth in ravines. A new ward was built on a site which had been

pronounced to be healthy after a survey; the only doubtful point being a potentially dangerous ravine, a furlong away, thickly grown with *blukar*. [Blukar is the thick tangle of creepers, ferns and undergrowth which fills the ravines of Malaya in their natural state and prevents the breeding of the dangerous *A. maculatus* in the streams buried beneath it.]

This ravine was in a rubber estate belonging to a Chinese who agreed not to clear away the blukar, and all went well until, a few years later, the estate was sold to a British company who cleared the ravine, with the result that malaria broke out among the patients in the new ward. A great deal of excellent drainage work has been carried out by Dr. Samuels with gangs of patients. They have been taught to make subsoil drain-pipes, and concrete inverts. Before the china-clay used in manufacturing these pipes was discovered on the hospital reserve, subsoil drains were improvised with empty condensed milk tins, placed end to end. "The bottom row consisted of 4 tins, the next of 3, the top row of 2 tins, the gaps between the various rows forming the channel for the water. These tin subsoil-drains proved most efficient, and lasted for years."

W. F.

JACQUES (F.). **Possible Contributing Causes of a Small Outbreak of Malaria in a Controlled Area.**—*Malayan Med. Jl.* 1931. Dec. Vol. 6. No. 4. pp. 125–126.

During abnormally dry weather, malaria occurred in a district of the town of Taiping, and also on some neighbouring rubber estates which had hitherto been free from malaria. The carrier, *A. maculatus*, was found breeding in situations which it normally shuns, such as concrete antimalarial drains and cemented wells. The author suggests that when the mosquito's usual breeding places are destroyed artificially, or by drought, it will lay its eggs in any available small, still or slowly moving, collection of clean water.

W. F.

GREEN (Richard) & GATER (B. A. R.). **The Relative Susceptibility of Some Malayan Anopheline Mosquitoes to Experimental Infection with Malarial Parasites.**—*Bull. Inst. Med. Res. Federated Malay States.* 1931. No. 4. 17 pp. [15 refs.]

A. kochi is widely distributed in Malaya, and is found near houses in large numbers, but epidemiological observations have shown that it is of little or no importance as a carrier. Naturally infected specimens have been found in the Dutch East Indies, but not in British Malaya. It is therefore surprising that the authors found it more readily infected experimentally, 82 per cent., than the notorious carrier *A. maculatus*, 67 per cent. It did not feed so readily on human blood, 46 per cent., as *A. maculatus*, 72 per cent. Though a species is easily infected in the laboratory, it does not follow that it is an important transmitter in nature. The duration of life in captivity probably gives no true indication of the natural life-span. Possibly *A. kochi* seldom lives long enough to become a carrier. To become dangerous it would have to show an increased liking for human blood.

W. F.

HARRIS (F.). **The Military Malaria Problem in Hong Kong.**—*Jl. Roy. Army Med. Corps.* 1932. Jan. & Feb. Vol. 58. Nos. 1 & 2. pp. 5–23 ; 92–102. With 6 figs. & 2 maps. [4 refs.]

Hong Kong is the fourth port in the world, and is the only Imperial coaling station east of Singapore. The island was ceded to Great Britain in 1841, the peninsula of Kowloon is held in perpetual lease, and the New Territories on the mainland on a ninety-nine year's lease from 1898. The towns of Victoria and Kowloon have a population of 600,000 of which 8,000 are British. The military population is 4,000. The whole colony is extremely hilly and consists of granite ridges separated by narrow valleys. In 1844, three years after the founding of the colony, malaria was so rife that there was serious talk of abandoning the island ; but with the development of Victoria the disease declined and now there is none in the town. In Kowloon, first occupied in 1865, the same thing occurred, and as it was built over malaria disappeared. Malaria to-day is still potent in the rural and suburban districts where *A. maculatus* and *A. minimus* breed in the clear hill streams ; not only Europeans, but even Chinese from north China who go into these districts, suffer severely, though the local Chinese appear to have acquired an immunity or tolerance. In the Peak district (altitude 1,200 to 1,700 feet) where many of the Europeans live, at the back of Victoria, there is no malaria, though *A. maculatus* is present. The troops in barracks in the country districts and in training camps suffer rather severely from malaria. About half of the infections are subtertian and the other half benign ; quartan is rare. It has long been realized that any anti-malaria measures carried out on War Department land in Hong Kong cannot be altogether successful so long as the adjacent land outside military control is swarming with anopheles, and unfortunately there is no prospect that the Civil Authorities will do anything in the matter. The most important military anti-malaria measures at present available are : avoidance of camps before the middle of November ; oiling ; screening by nets ; drainage (not yet available to full extent) ; repellants. The results obtained in 1930 were not unpromising. Prophylactic quinine in doses of 10 grains every evening, given to soldiers in camp, proved useless and will not be repeated. Mosquito nets slung in bell tents are useless, and now the kind of marquee known as " tents, I.P. privates " is in regulation use during the camping season in the Hong Kong and Liensin areas. An illustration of this tent is given showing the nets slung from two parallel bamboo poles.

W. F.

ARCHIVES DES INSTITUTS PASTEUR D'INDOCHINE. 1930. Oct. No. 12. pp. 3–110. With 3 plans, 5 charts & 17 figs. on 10 plates.—Le paludisme en Indochine [MORIN (H.) ; BORDES (L. A.) ; MESNARD (J.)]. [**Malaria in Indo-China.**] Index bibliographique des principaux travaux publiés sur le paludisme en Indochine.

The whole of this number of the Archives is devoted to this important subject. Dr. L. A. Bordes contributes a historical note in which he calls to mind that it was SIMOND who, as long ago as 1907, originally pointed out that, as regards malaria, Indo-China consisted of two distinct parts : first, the populous, flat, open country of the coastal deltas ; and, second, the jungle-covered, mountainous interior.

Malaria exists in the coastal plain, but it is mild and easily dealt with; the only severe cases occur in explorers and prospectors, who have returned from the interior; though, occasionally, there are epidemics of limited distribution after some disaster such as a typhoon or, it may be, following the introduction of a malignant strain of parasite from the hinterland.

In contrast to this, malaria of a most malignant type exists in the hilly interior. In the past, labourers working on roads and railways, and soldiers on military expeditions, suffered terribly, but it was not until the country began to be developed for rubber planting, by imported Annamite and Chinese labour, that the problem became really serious. The mortality among the pioneers was terrible, and quinine appeared to be useless as a preventive. A laboratory of medical entomology was founded under Dr. BOREL and, in 1926, the Government instructed the Pasteur Institute to study the health conditions of estates; Dr. H. Morin was put in charge of this investigation.

Dr. Morin contributes a résumé of the researches which have been made into the etiology of malaria in Indo-China, and, with Dr. L. A. Bordes, describes the antimalaria work which is being done. He has confirmed BOREL'S finding to the effect that the anopheline fauna of the interior resembles that of the Federated Malay States, and the excellent photographs at the end of the book, are very like photographs of Malaya. Malaria is at its worst in the red laterite areas—the *terres rouges*—and it is there that *A. maculatus* (Malaya's most important carrier) is to be found. Wherever malaria is severe, either *A. maculatus* or *A. minimus* is to be found. Where *A. minimus* is present alone there is less malaria than in places where *A. maculatus* is present as well, and, though this mosquito has not been found infected, there is no doubt that it is a most important carrier.

Drs. J. Mesnard and L. A. Bordes contribute a paper on the importance of the indigenous Mois as a reservoir of malaria (see this *Bulletin*, **1931**, Vol. **28**, p. 580).

W. F.

MORIN (H.); FARINAUD (M. E.); TOUMANOFF (C.); MORIN (H.). Recherches sur le paludisme au Tonkin. [**Malaria in Tonking.**] (Bassin du Fleuve-Rouge.—Saison sèche 1931.) 1. Orientation et méthodes des recherches [MORIN].—*Bull. Soc. Méd.-Chirurg. Indochine.* 1931. June. Vol. 9. No. 6. pp. 387–395; 2.—Premières constatations épidémiologiques [FARINAUD].—*Ibid.* pp. 396–406; 3.—Revision de la faune de la moyenne région: les vecteurs du paludisme local [TOUMANOFF].—*Ibid.* pp. 407–428; 4.—Premiers résultats acquis au Tonkin [MORIN].—*Ibid.* pp. 429–447. With 1 fig. [Pasteur Inst. Hanoi.]

This is an account of the work of the newly created anti-malaria service of the Pasteur Institute of Hanoi during the dry months of the year, January to April. There is practically no malaria in the flat, rice-growing country of the coastal delta; further inland some places are healthy and others, especially where irrigation is in force are malarious; the mountainous country of the interior is notorious for malaria of a most malignant type. Three species of anophelines, which are rare or absent in the healthy flat country, are common among the mountains and in the hilly unhealthy portions of the intermediate zone; these are *A. minimus*, *A. maculatus*, and *A. aconitus*. The

first species has been found infected during the present inquiry. Malaria is essentially a focal disease which depends on the presence of breeding places for the local vectors.

W. F.

ANAZAWA (K.). **Observations on Natural Malaria-Infection of the Various Formosan Anophelines, with Reference to the Critical Value of Each Species from the Malaria-epidemiological Point of View.**—*Taiwan Igakkai Zasshi (Jl. Med. Assoc. Formosa).* 1931. Oct. Vol. 30. No. 10 (319). [In Japanese. English summary pp. 75–76.] [Govt. Research Inst., Formosa.]

The following were the results of an examination of Formosan anopheles. The figures are the rates of natural infection found by the author.

A. sinensis Wiedemann : 0·8. Remains in stable or house, but more often in stable, after biting.

A. minimus Theobald : 2·4. Remains in stable or house, but more often in house, after biting. It is known as the " house mosquito."

A. maculatus Theobald : 0·4. Homophilic, but does not remain in house after feeding.

A. fuliginosus Giles : 0·2. Chiefly zoophilic, but does not remain in stable after feeding.

A. tessellatus Theobald : 1·9. Found in both houses and stables, but prefers human blood. Remains in house, after feeding, but not to same extent as *minimus*.

A. splendidus Koidzumi : 2·3. Only scanty material available, and further investigation is needed. Habits similar to those of *tessellatus*.

A. hatori : 0·6. Chiefly zoophilic. Sometimes remains after feeding.

A. pleccau : 0. Seldom invades houses or stables. Lives in the mountains.

The perniciousness of a species depends upon its transmitting ability, distribution, and seasonal prevalence.

W. F.

MANALANG (C.). **Malaria Transmission in the Philippines. I–VI.**—*Philippine Jl. Sci.* 1931. Vol. 45. pp. 241–249 ; 367–381. Vol. 46. pp. 47–59 ; 247–255 ; 363–369 ; 371–375. With 6 text figs. & 1 plate. [Refs. in footnotes.]

i. **The Natural Vector.** pp. 241–249. With 1 text fig. & 1 plate. [9 refs.]

Among 10,820 *A. funestus* (*minimus*) 34 positives were found. No positives were found among 2,008 *A. maculatus*, 11,280 *A. ludlowii*, 3,657 *A. philippinensis*, or 1,445 *A. fuliginosus*. One positive stomach was found in a specimen of *A. vagus* among a mixed lot of 17,810 *A. rossii* examined. The conclusion is that *A. funestus* (*minimus*) is the natural vector in the Philippines.

ii. **Infection of** *Anopheles funestus* **Giles** (*minimus*) **with Notes on its Density, Probable Range of Flight, and Larval Control.** pp. 367–381. With 1 text fig. [Refs. in footnotes.]

Mosquitoes were trapped in a small wire-gauze hut in which the catcher slept. Catching adult mosquitoes in a trap affords a trustworthy index of mosquito density ; the larval index fails in this

respect for it may be high at a time when mosquitoes are few. During the period of observation, there was a natural decrease in the anopheline density from November 1928 to 1930, quite unconnected with antilarval measures, though it might easily have been attributed to them. The flight range of *A. funestus* appeared to be greater than 1·5 kilometres (about a mile) which is the limit of economic efficiency. Paris green is therefore ineffective as a control measure in the Philippines.

iii. **Density and Infective Density of** *Anopheles funestus* **Giles.** Vol. 46. pp. 47–59. [Refs. in footnotes.]

"Much malaria with few transmitters and vice versa exist, and can be explained by a knowledge of the density and the infective number in the place at the time. Natural unexplained marked decline in density has been observed in two places and explains the sudden disappearance of transmission in certain uncontrolled localities, which are often attributed to antimalarial measures in controlled areas."

Numerical prevalence means little unless the percentage of infected mosquitoes is known.

iv. **Meteorological Factors.** pp. 247–255. With 3 text figs. [3 refs.]

A. funestus shows a rise in the rate of infection with an increase of rainfall, mean temperature and relative humidity. It breeds in permanent or temporary streams, and the influence of the rainy season on breeding probably explains the seasonal distribution of malaria in the Philippines.

v. **On the Maturation of the Ova of** *Anopheles funestus* **Giles.** pp. 363–369. With 1 text fig. [6 refs.]

A higher rate of infection in *A. funestus* coincides with the higher rate of females containing mature ova. This conclusion is opposed to that of James and Swellengrebel in Europe, but agrees with the finding of American workers in connexion with *A. quadrimaculatus.*

vi. **The Dark-Night Factor.** pp.371–375.

A study of malarial infection in a construction camp showed that transmission occurred four times more frequently on dark nights than when the moon was bright, and 87 per cent. of the infected mosquitoes were caught when there was no moon or when it was obscured by clouds.

W. F.

Holt (R. L.) & Russell (P. F.). **Spleen Survey of the Eastern Shore of Bataan Province, Luzon.**—*Philippine Jl. Sci.* 1931. June. Vol. 45. No. 2. pp. 211–219. With 1 text fig. [2 refs.]

A rapid malaria survey of this coast was made prior to military manoeuvres in the districts. From the examination of 900 school children it was concluded that malaria does not exist on the eastern coastal plain of Bataan except in cases imported from the foothills; as the foothills are approached, the spleen-rate becomes progressively higher. *A. ludlowi* is plentiful in the salt marshes of the coast, but it does not carry malaria in this district. *A. minimus* was found in several places, but it is not an effective vector in the coastal plain.

W. F.

BENARROCH (E. I.). **Studies on Malaria in Venezuela.**—*Amer. Jl. Hyg.* 1931. Nov. Vol. 14. No. 3. pp. 690–693. [2 refs.] [Lab. of the Internat. Health Division, Rockefeller Foundation, Maracay.]

The author summarizes his paper as follows :—

"Out of sixteen species of *Anopheles* recorded as occurring in Venezuela, only *A. albimanus* and *A. darlingi* have been proved to be vectors of malaria by dissections. Observations on the relative abundance of various species of *Anopheles* during a localized outbreak of malaria in a boys' school suggest that *A. bachmanni* is probably also a vector of the disease."

W. F.

SCHÜFFNER (W.). **Notes on the Indian Tour of the Malaria Commission of the League of Nations.**—*Records of the Malaria Survey of India.* 1931. Sept. Vol. 2. No. 3. pp. 337–347.

[Though many of these notes cover the same ground as the report of the Commission summarized on page 571 of Vol. 28 of this *Bulletin*, some of them express, or emphasize, the individual views of Professor Schüffner himself.] In both the Terai and the Duars, at the foot of the Himalayas, there are two very different races of people. (*a*) First, the Buxas and Tharus who are indigenous and suffer comparatively little from malaria, although the spleen rates of the children are 100 per cent. and those of the adults are very high. Soon after birth, the children are exposed to infection with the local strains of parasites, and those that survive develop a relative immunity. A perfect immunization is found only among a small minority of the inhabitants ; as in Sumatra, splenic enlargement persisting during adult life bears witness to the sufferings from malaria endured in youth. (*b*) The second race in these areas consists of the Desis who have immigrated from the over-populated plains. The effect of the local malaria on these immigrants has been most unfortunate, and the population is only kept up by constant recruitment from the plains. The Desis have not been immunized by constant exposure to malaria from birth, and it is because of their immigration that acute epidemic malaria occurs in the Terai side by side with the endemic form. Possibly, the strains of malaria which the immigrants import from the plains are stimulated to an exaggerated multiplication, or even virulence, through the influence of the local anophelines.

"Even if the use of paris green becomes very much extended in India, I do not believe that it will prove the solution of the malaria problem . . . oil, paris green, and quinine are only palliatives which we cannot yet do without. But the future lies in biological methods . . . irrigation and drainage, more especially subsoil drainage, are biological methods" ; other examples are the growing of brush-wood to shade streams, the periodical flushing of water courses, and the treatment of fish-ponds in Java (see this *Bulletin* 1930, Vol 27, p. 640).

With reference to blackwater fever, the Commission is satisfied that the distribution of the disease in India is clearly opposed to the view that it is merely a complication of malaria in places where the incidence is sufficiently high. Blackwater is observed in some areas where the spleen rate hardly reaches 50 per cent. ; it is absent in other districts where the rate is 100 per cent. Probably malaria with a

tendency to blackwater has a different etiology from the ordinary form, and may be associated with a specific plasmodium, which SINTON suggests is *P. tenue* Stephens. Again, certain species of anopheles may be capable of modifying the parasites in such a manner as to make them more apt to provoke blackwater. It may even be that certain races of mosquitoes exert this influence, for different races of the same species behave very differently as regards malaria: for instance *A. subpictus* (*rossi*) has never been found infected in British India, and *A. hyrcanus* (*sinensis*) is of no importance there; yet, both these mosquitoes are active carriers in the Dutch East Indies. On these grounds, the attempts of STRICKLAND and his collaborators to group varieties such as *A. minimus*, *A. aconitus*, *A. listonii* and *A. varuna*, into a single species under the specific name of *funestus* are likely to cause confusion. Another possible cause of blackwater is a combined infection of the plasmodium and some other parasite such as Bartonella.

W. F.

IYENGAR (M. O. T.). **The Relative Value of the Oöcyst Rate and the Sporozoite Rate in Anopheles.**—*Indian Jl. Med. Res.* 1931. Oct. Vol. 19. No. 2. pp. 525–539. With 3 charts & 1 graph in text. [1 ref.]

Where only gut infections, and never salivary gland infections, are observed in a species, it is evident that certain factors prevent the development of the oöcysts, and the infection rate based on oöcysts may not represent the transmitting capacity of the species in relation to the period of observation. "But where both gut infections and gland infections occur side by side, often in the same individual specimen, under such circumstances, oöcyst infections should certainly be included in the total infectivity rate in order to appraise the transmitting capacity of the species." (See SWELLENGREBEL and DE BUCK, this *Bulletin*, Vol. 28, p. 1018.). The maximum sporozoite infection and the highest infestation were found to occur during the 9th to the 12th day after the collection of mosquitoes for examination. From this date the sporozoite rate declined as the result of the discharge of sporozoites when the mosquitoes fed on the raisins supplied to them in their cages. The same would happen under natural conditions when mosquitoes obtained no further feeds of infected blood, or on the approach of winter when the development of oöcysts is stopped.

W. F.

BOURGUIGNON (G. C.). Contribution à l'étude de l'évolution spontanée du paludisme. [**The Course of Untreated Malaria.**]—*Ann. Soc. Belge de Méd Trop.* 1931. June 31. Vol. 11. No. 2. pp. 139–149. With 12 text figs.

During a short visit to Shabunda (Kivu, Belgian Congo) the author had the opportunity of studying malaria among a people to whom quinine was unknown. The parasite index in children under eighteen was 82·6, in adults it was 56·5, and he calculated the natural rate of

spontaneous recovery, without drugs, at 31·6 per cent. The gametocyte index among the children was 24·7; among the adults it was only 14·5. The splenic index was 76·8 in children, and 12·2 in adults.

W. F.

STRATMAN-THOMAS (W. K.). **On the Supposed Antagonism between Alfalfa and Malaria.**—*Amer. Jl. Hyg.* 1931. Sept. Vol. 14. No. 2. pp. 394–410. With 1 diagram. [13 refs.]

WILLCOCKS suggested that certain parts of Egypt were relatively free from malaria because leguminous crops, such as clover, were cultivated there (this *Bulletin*, 1928, Vol. 25, p. 557). D'HERELLE (1924) supposed that the decline of malaria in many parts of the Netherlands coincided with the introduction of melilotus, and that in the Argentine the freedom of the clover districts was due to the feeding of the anopheles on the nectar of the clover flowers. He suggested that the glucoside coumarin, present in dried clover, killed the plasmodia in the mosquito. Bruce MAYNE (this *Bulletin*, 1930, Vol. 27, p. 658), however, has demonstrated that coumarin has no plasmodicidal value in mosquitoes. The author examined 1858 people on 13 plantations situated in the Mississippi delta, where there has been an almost uninterrupted decline in the mortality from malaria since the introduction, 25 years ago, of the leguminous alfalfa in place of the cotton crops which had been ruined by the boll weevil. He found that the malaria index of the total population was 3 per cent., but that in areas near standing water it was 9·45 per cent., whether alfalfa was growing there or not. He found no correlation between the distance of residence from alfalfa and the incidence of malaria. Alfalfa will not grow in a waterlogged soil, and therefore the land is drained where it is cultivated; this is the only connexion between alfalfa and malaria prevention. "People living adjacent both to standing water and alfalfa are not protected from malaria by alfalfa . . . wherever a decline in malaria incidence coincides with the planting of alfalfa this decline is due directly to the proper drainage necessary . . . for the cultivation of alfalfa."

W. F.

KLIGLER (I. J.) & MER (G.). **Studies on Malaria. VIII. The Migration of Infected *A. elutus* at Various Seasons of the Year.**—*Jl. Preventive Med.* 1931. Sept. Vol. 5. No. 5. pp. 401–407. With 1 text fig. [3 refs.] [Hyg. Dept., Hebrew Univ., Jerusalem.]

The authors have previously published evidence that *A. elutus* covers distances up to 8 kilometres (5 miles) during its hibernation flight, while its range at other times is little more than a quarter of this distance. (See this *Bulletin*, 1929, Vol. 26, p. 6; and, 1931, Vol. 28, p. 589.)

The present paper records the results of further observations in the same area. The inhabitants of a given district were treated with chinoplasmine, and the incidence of infected mosquitoes was observed among them and in neighbouring untreated villages. It was again found that during the pre-hibernating period, a wide-range dispersion occurs, amounting to 12 kilometres; and also that treating the population

near the breeding area leads to a diminution of infected mosquitoes, not only in the treated villages but also in those far from the breeding zone.

W. F.

MARTINI (E.). **Spring Malaria. Convincing Observations by Bergman before the Time of Laveran.**—*Riv. di Malariologia.* 1931. July–Aug. Vol. 10. No. 4. pp. 512–514.

The author republishes part of an essay published by FLENSBURG in 1912, containing numerous examples—some of them made more than a hundred years ago—of spring malaria resulting from infection in the previous year. This prolonged incubation was not, therefore, as SWELLENGREBEL supposes, first noticed by KORTEWEG. The author does not agree with SWELLENGREBEL that spring malaria is due to infection in the previous autumn—October to December—but believes that it is contracted in summer and early autumn. BERGMAN wrote in 1875 and 1877.

W. F.

DE BUCK (A.), SCHOUTE (E.) & SWELLENGREBEL (N. H.). Nouvelles recherches sur les races d'*Anopheles maculipennis* aux Pays-Bas. (Leur rapport avec l'anophélisme sans paludisme. Comparaison avec ce phénomène tel qu'il existe au Bengale et en Assam.) [**Races of** *A. maculipennis* **in the Low Countries. Anophelism without Malaria.**]—Reprinted from *C.R. 2e Congrès Internat. du Paludisme.* Algiers. 1930. Vol. 1. pp. 293–299.

There are two races of *A. maculipennis* in the Low Countries: a hibernating race, and a non-hibernating race. Both cease to lay eggs at the beginning of September, but, while the hibernating race also ceases to feed, the non-hibernating race continues to do so (Gonotrophic dissociation, see this *Bulletin*, 1930, Vol. 27, p. 196), and it is just at this time that the transmission of malaria takes place. Malaria occurs in places where the non-hibernating mosquitoes are plentiful, but not in those where only the hibernating variety is found, because the latter do not feed during the malaria season, which is in the autumn. Even if they are roused to feed by artificial warmth, digestion of blood is very slow and it is difficult to infect them during the winter, though the non-hibernating race is easily infected. The latter breeds readily in confined spaces, but the hibernating race will not breed in captivity, a nuptial flight is necessary for it, and for this purpose it is adapted by its larger size and longer wings. The shorter winged non-hibernating race, in which copulation takes place without a nuptial flight, is an indoor mosquito. The hibernating race, in August, feeds largely on vegetable juices, the crop is filled with a clear fluid and the fat-bodies enlarge; this does not occur in the other race. There are several other morphological distinguishing features in adults, larvae and eggs. The dangerous, non-hibernating race breeds in brackish water, the other race breeds in sweet water, and the author suggests that the former can be abolished by agricultural development which will keep out the sea. It is uncertain whether the two races are simple modifications due to environment, or whether they are hereditary varieties; but the non-hibernating race retains its character when artificially cultivated in the laboratory for several generations.

W. F.

BRIGHENTI (Dino). Anofelismo senza malaria e specie anofeliche. [**Anopheline Species and Anophelism without Malaria.**]—*Arch. Ital. Sci. Med. Colon.* 1931. Oct. 1. Vol. 12. No. 10. pp. 595–600. English summary (7 lines). [Zool. Inst., Univ., Bologna.]

As a result of investigation of places where Anopheles exists but malaria is absent the author finds that *A. maculipennis* constitutes 95 per cent. or more of the species found; e.g. in Jolanda (Savoy) where *A. sacharovi* may be found up to 3 per cent., or bonificated parts of Bologna where the same and *A. pseudopictus* together amount to about 5 per cent. only, whereas in malarious districts not only are there other species but they constitute from 20 to 50 per cent. of the total. Thus in the malarious parts of Ferrara are found *A. maculipennis, A. sacharovi* (20–50 per cent.), *A. algeriensis* and *A. bifurcatus*; in Macedonia, the first two and *A. superpictus*. In short, the author concludes that where *A. maculipennis* is present almost alone or very greatly predominating, there is anophelism without malaria. He ascribes this [but without adducing much evidence] to the adaptability of *A. maculipennis*; where there is bonification, or gamete carriers are few, the blood of cattle is preferred to that of man.

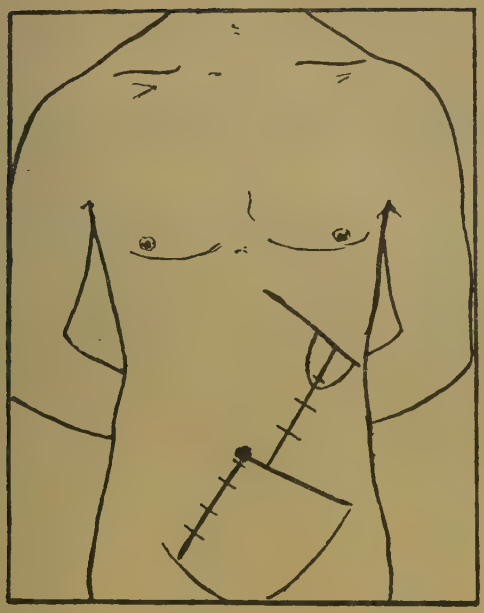
H. H. S.

AMSTERDAM. BUREAU D'ENCOURAGEMENT POUR L'EMPLOI DE LA QUININE. Le paludisme et l'enfant. [**Malaria in Childhood.**]—Reprinted from *Rev. Internat. de l'Enfant.* Geneva. 1931. Vol. 12. 75 pp. With 22 figs. [76 refs.]

Malaria lowers fertility, provokes abortion, and kills the newly born. Sir Patrick HEHIR estimated that malaria causes some 300,000 miscarriages every year in Bengal alone; BLACKLOCK and GORDON found that in confinements where the placenta contained parasites, 25 per cent. of the infants died within a week. Touching the question of hereditary malaria "opinions are divided; it seems, however, that the theory of heredity rests on a firm basis, though its advocates have not yet clearly demonstrated the route by which infection occurs." On the question of quinine during pregnancy, it is the opinion of the authorities quoted that malaria is far more dangerous and more likely to cause abortion than quinine, which should on no account be withheld. It acts as an abortifacient only when abortion is imminent.

With reference to the excretion of quinine in the mother's milk and its administration to the suckling by this route, the figures quoted show that this method cannot be trusted: during the first hour after quinine has been administered to the mother, her milk contains a minute quantity of the drug, but too little to be of much use, and after the first hour it contains none.

The method of spleen measurement recommended here is SCHÜFFNER'S (see this *Bulletin*, 1923, Vol. 20, p. 551): a line is drawn along the left costal arch, and a second line parallel to the first is drawn from the umbilicus. These two lines are joined by a third passing through the apex of the spleen. This third line is divided into four equal parts, and a spleen which lies on the first quarter is called a "spleen 1," and so on. For spleens which pass the umbilicus, the junction line is prolonged; extreme enlargement of the spleen is in "spleen 8." The next section of the pamphlet deals with the statistics of child malaria in different parts of the world, and this is followed by



SCHUEFFNER's method for determination of the splenic index.
[Reproduced from the *Transactions of the 4th Congress of the Far Eastern Association of Tropical Medicine.*]

a chapter on prophylaxis and treatment. It is hopeless to hand quinine to native children and to trust them to swallow it; if it is impossible for the medical man to administer it himself, it should be given by the teachers when the children are at school.

A subsection on propaganda includes reproductions of several posters used in the Dutch Indies and elsewhere, and also a Spanish hymn to quinine which is sung in the schools of Panama. With regard to the posology of quinine opinions differ:—Professor Peter MÜHLENS recommends; up to 2 years, 0·05 to 0·10 gram; up to 4 years, 0·2 gram; up to 6, 0·3, up to 8, 0·4; and so on, increasing 0·1 gram for every two years until 1 gram is reached at 18 years. When euquinine is given the dose should be 1½ times as large. (See also CLEMESHA, this *Bulletin*, 1931, Vol. 28, p. 576.)

W. F.

MAYNE (Bruce) & GRIFFITTS (T. H. D.). *Anopheles atropos* **D. & K.—a New Potential Carrier of Malaria Organisms.**—*Public Health Rep.* 1931. Dec. 25. Vol. 46. No. 52. pp. 3107–3115. With 3 figs. on 1 plate.

Anopheles atropos is a dark mosquito with an unspotted, almost transparent wing, and it assumes a hunched-up stance, like a culex. It breeds in salt marshes with a salinity of 3 to 21 per cent. It attacks in direct sunlight as well as by night, and has been found in large numbers in occupied rooms. In infectivity tests it proved equal in efficiency to

A. quadrimaculatus as a potential carrier of *Plasmodium vivax.* It has been found in Mississippi, Louisiana, Alabama, and Florida.

W. F.

WATSON (M.). **Some Clinical Features of Quartan Malaria.**—Reprinted from *Jl. Malay Branch Brit. Med. Assoc.* 1904. Jan. New Ser. No. 1. 16 pp. Reprinted with added Preface dated Jan. 3, 1932.

Considerable interest in quartan malaria and nephritis has been aroused by the recent work of GIGLIOLI and others. This paper gives the early work of the author on quartan, and shows how often it kills in cold blood, masquerading as some non-febrile disease. Work in Malaya on the association between quartan malaria and nephritis seems to have been entirely overlooked. In 1912 J. Tertius CLARKE of the Malay States wrote " Every medical man knows that, given the malaria parasite, he may find albuminuria, but he does not know that, given the albuminuria without fever, he may find malaria parasites in over 50 per cent. of the cases, and of these almost 100 per cent. are quartan." It is for these reasons that the paper is republished. In 39 per cent. of 66 quartan cases, the fever was recognizable as such ; in 24 per cent. it was mainly quotidian ; in 36 per cent. there was no fever, or it occurred only at long intervals. Oedema was prominent in 32 per cent., and, in many of these cases, the urine contained albumen. Diarrhoea, dysentery, pulmonary complications, and pyogenic infection were frequent complications, and this explains why the fall in the death rate from malaria which follows successful malaria control is accompanied by a fall in the death rate from other diseases. The author mentions, in his preface, that he doubts the occurrence of " malarial hyperpyrexia."

W. F.

MARCHOUX (E.). Variétés nouvelles sur le paludisme. [**Malarial Novelties.**]—*Bull. Acad. Méd.* 1931. Oct. 13. Year 95. 3rd Ser. Vol. 106. No. 31. pp. 183–188.

The author outlines the mode of transmission of malaria to man by the mosquito, ROUBAUD'S theory of the protection of man by domestic animals, and the importance of the house as the place of infection. He then discusses treatment. Although relapses may occur after plasmoquine they are less common than after quinine. One of several curative products prepared at the Pasteur Institute in Paris by FOURNEAU, and bearing the number 710, is therapeutically as active as plasmoquine, it is less toxic, and, if one may judge from the experiments of SERGENT with *P. relictum* of the canary, it has a similar action on sporozoites. It is related chemically to plasmoquine, and is a N-diethylaminopropyl-8-amino-6-metoxy-quinoleine.

W. F.

HUGHES (T. A.) & SHRIVASTAVA (D. L.). **Observations on Anaemia in Patients with Enlarged Malarial Spleens.**—*Indian Jl. Med. Res.* 1931. Oct. Vol. 19. No. 2. pp. 565–584. With 3 text figs. [9 refs.] [King Edward Med. College, Lahore.]

" In the production of anaemia in certain patients whose spleens have become enlarged as a result of chronic malaria causes other than

the direct destruction of red blood cells by the parasites, but nevertheless connected with malaria, would seem to be operative." This paper is based on a study of anaemia in 31 chronic malarial patients with splenomegaly who showed little or no signs of active malarial infection. As the result of their investigations, the authors suggest that, in the milder cases, the anaemia is due to destruction of the red cells by the reticulo-endothelial cells of the enlarged spleen (and possibly of other organs), facilitated in some instances by abnormal fragility of the corpuscles. In severe cases, there were in addition signs of derangement of the function of the bone-marrow. Four severe cases were treated with liver and iron, with the result that improvement took place in three. In the fourth, neither red cells nor haemoglobin increased, and it appeared from the estimations of the bilirubin in the plasma that the destruction of the corpuscles was keeping pace with thir increased production.

W. F.

MARTINI (E.). Zwei Malariafälle. Langfristige Inkubation und langfristiges Rezidiv. [**Two Cases of Malaria. Long Incubation Period and Long Delayed Relapse.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1931. Oct. Vol. 35. No. 10. pp. 577–583. [15 refs.] [Inst. for Ship & Trop. Diseases, Hamburg.]

The female assistant of the author was bitten by *A. maculipennis*, which were infected with *P. vivax*, on June 1st 1927 at Hamburg. She remained well till May 29th 1928, when she had a rigor with high fever. There was no possibility of infection with malaria in the interval. Blood examination showed parasites (*P. vivax*) with many gametocytes. She was treated with plasmoquine and recovered rapidly. The author himself, whilst engaged in studying mosquitoes in the Pontine marshes, was bitten by them on July 21st and 23rd 1930, and at Gorino on July 27th. He felt ill on August 4–5th, and on August 6–7th had slight shivering. Examination of his blood on August 7th and 8th gave negative results. On August 9th, quinine was commenced and continued till August 18th. There was nothing noteworthy till June 12th 1931, when he had a rigor, but continued work. On June 13th rings and gametocytes of *P. falciparum* were found in thick films of his blood. On the 14th he had a typical attack of malaria. On 15th quinoplasmine was commenced and continued for 3 weeks. He had no further attacks. In his discussion of the question of relapse he refers to the work of JAMES. He considers that spring relapses after the primary infection in autumn are influenced considerably by meteorological conditions as to whether they occur late or early in spring.

E. D. W. Greig.

BUTLER (G. G.). **Malaria in Parturient Women.**—*Gold Coast Rep. of Laboratory Services Year 1929–1930.* Appendix C. pp. 31–33.

Blood-smears from the finger and from the placenta were examined in 328 confinements. Subtertian parasites were found in both placenta and peripheral blood in 53; in the placenta only, in 23; in the peripheral blood only, in 6. The parasites in the placenta comprised sporulating, and stumpy or solid forms; rings were rare, and crescents

were absent. Taking pigment and parasites together, there was evidence of malaria in about 40 per cent. of the placentas. Ninety per cent. of the women with healthy placentas went to full term, but only 70 per cent. of those with infected placentas. Blood from the umbilical cord was examined in 50 cases but parasites were found in only one, and in that case the technique was probably faulty. It is possible that an infant born with an infected placenta may be passively immunized by it. "Infection must be so universal that it can scarcely be affecting the people or the race would be dying out, or have died out, long ago."

W. F.

LOMBART (H.). La malaria congenitale chez les noirs d'Elisabethville. [**Congenital Malaria among the Natives of Elisabethville.**]—*Ann. Soc. Belge de Méd. Trop.* 1931. Aug. 31. Vol. 11. No. 3. pp. 315–319. [4 refs.] [Govt. Lab., Elisabethville.]

Blood films were made from the peripheral blood of 50 parturient women and from the placenta and cord in each case; also from the infants at birth and on the five following days. Fifty-six per cent. of the mothers had parasites, though these had no apparent ill effect upon their health. Parasites, especially dividing forms, were found in 50 per cent. of the placentas. Blood from the cords contained parasites in only one case. The films taken from the infants were all negative.

W. F.

YORKE (Warrington) & MURGATROYD (Frederick). **Malaria in Pregnancy.** —*Ann. Trop. Med. & Parasit.* 1931. Dec. 31. Vol. 25. Nos. 3 & 4. pp. 551–553.

A patient from West Africa who was 7 months pregnant, had a moderate subtertian infection. She was given 15 grains of quinine daily for 9 days, and parasites disappeared. Subsequently she was given 15 grains every Saturday and Sunday, up to full term and, during that period, she had several mild relapses. Sections of the placenta showed massive infection of the maternal sinuses, but the blood in the foetal vessels of the chorionic villi was free from infection, and the child was healthy.

W. F.

THOMAS (G. C.) & RIDOUT (G. B.). **Anaphylactic Shock accompanying Benign Tertian Malaria.**—*U.S. Nav. Med. Bull.* 1931. July. Vol. 29. No. 3. pp. 470–472.

A young seaman had a rigor followed by fever, and a sudden anaphylactic reaction with giant urticarial wheals covering the entire body and extremities, and considerable oedema of the glottis. His pulse was 140 and very weak. Benign tertian parasites were found in his blood, he was given quinine and on the following day he felt very well. On the third day he had another paroxysm of malaria, and the anaphylactic symptoms returned. Temperature 106° F., pulse 160 and very weak, lungs filled with moist rales, breathing dyspnoeic. The response to adrenalin was rapid. Subsequently he had no more paroxysms and no more anaphylactic symptoms. There was no history of asthma or hay-fever in himself or his family.

W. F.

HÉDERER. Trois cas d'anémie paludéenne traités par l'opothérapie splénique. [**Three Cases of Malaria treated with Injections of Spleen Extract.**]—*Arch. Méd. et Pharm. Nav.* 1931. Apr.–May–June. Vol. 121. No. 2. pp. 210–225. [5 refs.]

The researches of the Toulouse school have demonstrated the important part played in the process of blood regeneration by insaponifiable lipoids extracted from the spleen. Details are given of three cases of severe malarial anaemia, selected from a number treated by the author with intramusular injections of an ampoule of "lipospléninе" every other day; quinine and blood transfusion were employed when necessary. The results of the treatment were a remarkable increase in the number of the blood cells, a progressive lessening of the splenomegaly, an increase of weight, and a great amelioration of the general condition.

W. F.

ADAMS (Jas. M.). **The Standard Treatment of Malaria. (A Preliminary Report.)**—*New Orleans Med. & Surg. Jl.* 1931. Nov. Vol. 84. No. 5. pp. 379–384. [12 refs.]

This was the subject of a paper read before the Louisiana State Medical Society. Bass's standard treatment consists of 10 grains of quinine sulphate, three times a day, for three days, or until the clinical symptoms have subsided; and, 10 grains every night, for a minimum period of 8 weeks. BETHEA has suggested that the dose should be modified according to the patient's weight, 1 grain being given daily for each 5 pounds of body weight until the fever ceases, and then, 1 grain nightly for every 15 pounds during the next 8 weeks.

The author treated 1,562 cases as out-patients. Patients with benign tertian were given 99 grains of quinine to take home, and were instructed to swallow 10 grains three times a day. Quartan patients were given 120 grains; subtertian cases were very rare. They were told to return when the quinine was finished, and they were then given sufficient to complete the treatment of 10 grains every night for 8 weeks. The drug was given in the tablet form.

The results were good, and there were 90 per cent. of apparent cures. In the discussion which followed, Dr. BETHEA said that the 10 per cent. uncured probably consisted of people who had not taken the quinine which had been supplied to them. Dr. C. C. BASS agreed; he said that he had tried to find some of the so-called quinine-fast cases, but without success.

W. F.

PIRAMI (Ester). Chinostovarsol e Malaria. [**Quiniostovarsol in Malaria.**]—*Arch. Ital. Sci. Med. Colon.* 1931. Dec. 1. Vol. 12. No. 12. pp. 714–729. English summary (7 lines). [Inst. of Colonial Path., Univ., Modena.]

Quiniostovarsol, the oxyacetylaminophenylarsenate of quinine, as prepared at the National Institute of Chemotherapy contains 50 per cent. stovarsol. Three methods of administration are recommended: 1. For prevention, one tablet of 0·25 gm. daily before food; 2. For continued treatment, two tablets night and morning till the symptoms disappear; 3. Intermittent treatment, four tablets daily for 3 or 4 periods of 10 days, with intervals of 5 days.

The author reports the results in 25 patients, 14 with benign tertian, 3 quartan, 8 subtertian. He used the third method but modified it

by giving 3 tablets to adults and correspondingly less to children; one in each group had 4, and one with more serious symptoms and daily fever had five. Though notes of each patient are given, the dates of disappearance of the parasites cannot be stated as the patients were not under daily supervision. The results were very good on the whole. Two of the benign tertians relapsed later, as did two of the subtertians; in two others of the latter the result is uncertain as the patients left the district. Apart from disappearance of parasites from the blood, the splenic enlargements soon became reduced and improvement in the general well-being was marked.

H. H. S.

DECOURT (Philippe). Traitement des paludismes anciens par spléno-contractions adrénaliniques répétées. [**Treatment of Relapsing Malaria by Splenic Contractions induced by Adrenalin.**]—*Rev. Méd. et Hyg. Trop.* 1931. July–Aug. Vol. 23. No. 4. pp. 231–232.

The author comments on the difficulty of curing chronic relapsing malaria when the parasites lie hid in the spleen where no drug can reach them. His plan is to carry out a six days' treatment with quinine and arsenic, and at the same time to give injections of 1 to 2 cc. of adrenalin (1 in 100 solution) every morning, with the object of producing splenic contractions and so driving the parasites into the blood-stream where the quinine can get at them.

W. F.

DAWSON (W. T.) & NEWMAN (S. P.). **Acquired Allergic Coryzal Reaction to Quinine but not to Quinidine or Quitenine.**—*Jl. Amer. Med. Assoc.* 1931. Sept. 26. Vol. 97. No. 13. p. 930. [10 refs.] [Med. School, Univ. of Texas, Galveston, Texas.]

The subject, a man of 24, had repeatedly taken quinine when a child without ill effect, but between the ages of 16 and 23 he became hypersensitive. About an hour after swallowing a couple of grains of quinine hydrochloride, the eyes and nose began to itch and run. The skin test was not positive. Quinidine and quitenine (a possible hepatic oxidation product of quinine, probably useless in malaria) produced no reaction when given by the mouth. The subject's brother, with a similar history of earlier tolerance of quinine, developed an urticarial reaction to the drug.

W. F.

SANDERS (J. P.). **Treatment with Malaria and Acquired Anaphylactoid Reaction to Quinine: Successful Use of Quinidine.**—*Jl. Amer. Med. Assoc.* 1931. Sept. 19. Vol. 97. No. 12. pp. 850–851. [2 refs.]

A woman of 47 who had been treated with quinine when a child of 8, later became intolerant. When she was 20, the drug produced severe reactions in about 15 minutes, with urticaria, dyspnoea and vomiting. When she was 45, an eighth of a grain had the same effect. The skin test was positive with quinine, but negative with its dextrorotatory isomer quinidine. The latter drug was therefore administered as a remedy for the chronic malaria from which she was suffering, with the result that the parasites disappeared and there was no reaction. Her son had an attack of urticaria on the one occasion on which he was given quinine, but the skin test was negative in this case. The patient could take plasmoquine without a reaction.

(See DAWSON and GARBADE, this *Bulletin*, 1931, Vol. 28, p. 62.)

W. F.

SCHULEMANN (Werner), SCHÖNHÖFER (Fritz) & WINGLER (August). Synthese des Plasmochin. [**Synthesis of Plasmoquine.**]—*Klin. Woch.* 1932. Feb. 27. Vol. 11. No. 9. pp. 381–384. [29 refs.]

This is a highly technical paper dealing with the work of the authors on the chemistry of plasmoquine. Chemical formulae are given to illustrate the method of building up plasmoquine and the chemical structure of the latter is contrasted with that of quinine. The paper should be consulted in original by chemists and others interested.

E. D. W. Greig.

ROSKIN (Gr.) & ROMANOWA (K.). Arzneimittel und ultraviolette Strahlen. X. Mitteilung. Bestrahltes Chinin bei Vogelmalaria. [**Irradiated Quinine in the Treatment of Bird Malaria.**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1931. Vol. 72. No. 5/6. pp. 445–449. [1 ref.] [Microbiol. Research Inst., Education Commissariat R.S.F.S.R., Moscow.]

The authors' results are incorporated in two tables; they reach the following conclusion: that in the treatment of experimental bird malaria a preliminary irradiation of the quinine solution with ultra violet rays produces a distinctly higher therapeutic activity than that of untreated quinine in the same doses. The exact nature of the chemical change in the quinine will form the subject of a further research.

E. D. W. Greig.

ANDREWS (Justin). **"Zebe-à-pique" as a Malariacide in Grenada, B.W.I.**—*Amer. Jl. Hyg.* 1930. Mar. Vol. 11. No. 2. pp. 411–412. [Johns Hopkins School of Hyg. & Public Health, Baltimore.]

In the course of a malaria survey of Grenada, B.W.I., the author tested the reputed antimalarial action of *zebe-à-pique* or the Bastard Cedar Bush (*Parphenium hysterophorus* Grisabach). Extracts of the leaves in alcohol and in water were administered to six malarial (subtertian) subjects while other six received quinine. The effect of zebe-à-pique as regards both fever and presence of parasites was nil.

A. G. B.

RUSSELL (Paul F.). **Avian Malaria Studies. I–III.**—*Philippine Jl. Sci.* 1931. Vol. 46. pp. 305–345; 347–361; 651–679.

i. **Prophylactic Plasmochin in Inoculated Avian Malaria.** pp. 305–345. With 20 text figs. [196 refs.]

"Three experiments are reported in which canaries were given intramuscular injections of . . . saline and blood containing *Plasmodium cathemerium* on the third day of a week during which they received daily doses of plasmochin simplex intramuscularly. In no case was it possible to detect an infection in these birds, although in every case control birds that had not received plasmochin developed typical avian malaria."

ii. **Prophylactic Plasmochin versus Prophylactic Quinine in Inoculated Avian Malaria.** pp. 347–361. With 7 text figs. [4 refs.]

One lot of birds was given daily injections of plasmoquine for a week, and a second lot was given quinine. They were inoculated with blood containing *P. cathemerium* on the 3rd, 4th, 5th, 6th and 7th days. Those in the plasmoquine series which were inoculated before the end of the week were all protected, but the birds inoculated on the seventh day, five hours after their last dose, became infected, as did all the birds in the quinine series.

iii. **The Experimental Epidemiology of Avian Malaria : Introductory Paper.** pp. 651–679. With 3 text figs. and 3 figs. on 2 plates. [160 refs.]

This paper describes introductory experiments on the epidemiology of malaria (*P. cathemerium*) among a population of canaries, where the vectors were *Culex pipiens* or *C. quinquefasciatus* (*C. fatigans*). The mosquitoes were bred in special cages; the larvae being fed on Löffler's dehydrated blood serum mixed with litmus milk, and the adult males on raisins in sugar syrup. The number of mosquitoes was counted daily, and the spread of infection was studied under controlled conditions among canaries introduced into the cages, the proportion of gametocyte carriers (after inoculation) among the canaries introduced being different in different cages.

W. F.

MILANI (C.) & CUBONI (E.). Inoculation de la malaria chez l'homme et immunité antimalarique. [**Inoculated Malaria and Immunity.**]—*Boll. Sezione Ital., Soc. Internaz. di Microbiologia.* Milan. 1931. Sept. Vol. 3. No. 9. pp. 521–527. With 3 text figs. [1 ref.]

Among 145 patients inoculated with strains of *Plasmodium vivax*, 3, or 2·06 per cent., resisted infection, although they had never had malaria. (See S. P. JAMES, this *Bulletin*, Vol. 28, 1931, p. 567.) In addition, among 134 patients with no history of malaria, 14, or 10·44 per cent., recovered spontaneously before the occurrence of the twelfth paroxysm. The authors consider that some individuals possess a natural resistance to malaria, perhaps for only a period of life, which may be congenital. In patients with a history of malaria, there was a greater tendency to spontaneous cure; in fact all the 8 who were inoculated recovered without treatment—3 after five paroxysms, 3 after four, and 2 after two. Inoculation malaria, like the naturally acquired disease, produces a relative immunity. In 56 re-inoculations, subsequent to previous successful inoculation, 59 per cent. failed, and of those which "took" 95 per cent. recovered spontaneously. The immunity increases with successive re-inoculations; the greater the number of inoculations the smaller is the chance of being able to re-infect. The resistance to infection does not appear to be influenced by the state of health of the patient, nor does it make any difference whether he is suffering from G.P.I. or some other nervous disease. The proportion of spontaneous recoveries is influenced by the season during which the inoculation is made: in spring and winter the number of such recoveries is 15 to 20 per cent. higher than in summer and autumn.

W. F.

CIUCA, BALTEANU (I.) & BALLIF (L.). Contributions à l'étude du traitement abortif de l'infection paludéenne intentionnellement provoquée par inoculation de sang virulent de Laverania. [**Abortive Treatment of Malaria produced by Inoculation of Infective Subtertian Blood.**]—*Bull. Soc. Path. Exot.* 1931. Oct. 14. Vol. 24. No. 8. pp. 645–649. [Hyg. Inst. & Centre of Local Malaria Therapy, Jassy.]

Commencing a few days after they had been inoculated with subtertian-infected blood, a number of paralytics were treated with

various antimalarial drugs during the incubation period of the malaria, and this treatment was continued for about three weeks. Four were given plasmoquine, 5 quinoplasmine, 8 quinio-stovarsol, 3 quinine. They were kept under observation for six months; none of them developed malaria and none showed parasites in the blood with the exception of one of the cases treated with quiniostovarsol, in which crescents were found. The blood of this man was inoculated into other patients, but without result for the crescents were unable to produce infection.

W. F.

WOLTER (A.). Ueber die Schnelldiagnose der Malaria mit Hilfe des Dunkelfeldes. [**Dark Ground Illumination for Rapid Diagnosis of Malaria.**]—*Dermat. Ztschr.* 1932. Jan. Vol. 63. No. 1–2. pp. 69–72. With 2 figs. [7 refs.] [Univ. Skin Clinic, Bonn.]

The author strongly recommends dark ground illumination for the detection of malarial parasites in blood films. He states that the parasites, including the youngest forms, are easily and quickly found; the pigment of the parasite stands out brightly against the black background. The examination of vitally stained blood films with dark ground illumination is recommended also since very beautiful preparations are got by this method.

E. D. W. Greig.

DENES (G.). Recherche du parasite malarique dans le sang veineux. [**Examination of Venous Blood for Malaria Parasites.**]—*Boll. Sezione Ital., Soc. Internaz. di Microbiologia.* Milan. 1931. Oct. Vol. 3. No. 10. pp. 662–663. [Provincial Lab. of Hyg. & Prophylaxis, Padua.]

Instead of a few drops of blood for serological tests and some badly-made films for microscopical examination, it is far better to have 5–10 cc. of blood sent to the laboratory in a test tube. The serum is pipetted off for agglutination tests, cultures are made from the clot, the bloody serum at the bottom of the tube is centrifuged and the deposit is used for making blood films. The parasites are well preserved and, in subtertian, there is a concentration of parasites at the bottom of the tube, owing to the increased specific gravity of the infected corpuscles.

W. F.

THOMSON (J. G.). **Some Observations on the Nuclear Structure of the Malignant Tertian Malarial Parasite** (*Plasmodium falciparum*).—*Jl. Trop. Med. & Hyg.* 1932. Jan. 1. Vol. 35. No. 1. pp. 1–4. With 22 figs. on 1 plate. [3 refs.]

Ordinary, dry-fixed blood-films do not give a true picture of nuclear structure, and the author has therefore studied it in sections and wet-fixed films. The most useful stain for sections is Heidenhain's, used after removal of all pigment with acid alcohol. Parasites in sections shrink during the fixing process and are far smaller than those in dry-fixed films where they are flattened and stretched out. A series of excellent drawings, to which the reader should refer, accompanies this paper. (See also SINTON and MULLIGAN, this *Bulletin*, 1931, Vol. 28, p. 146.)

W. F.

TSCHILOW (K.). Untersuchungen ueber das Koagulationsband nach Weltmann unter besonderer Berücksichtigung der Malaria. [**Investigations on the Coagulation Band with Special Reference to Malaria.**]—*Wien. Klin. Woch.* 1931. Sept. 11. Vol. 44. No. 37. pp. 1164–1166. [2 refs.] [Therap. Clinic, Univ., Sofia.]

Using the method of Weltmann*, the author studied 46 cases of malaria, benign and malignant tertian as well as mixed infections. He finds that in malaria the coagulation band (K.B.) is lengthened, namely, to 8 and 9 tubes in place of the 6 and 7 of normal sera. He considers the reaction to be a non-specific one like blood corpuscle sedimentation.

E. D. W. Greig.

LE BOURDELLÈS (B.) & VELLUZ (L.). Malaria-floculation de Henry et protéines du sérum palustre. [**The Blood Proteins and Henry's Reaction in Malaria.**]—*C.R. Soc. Biol.* 1931. Oct. 23. Vol. 108. No. 29. pp. 402–403. [2 refs.]

Henry's reaction, with ox eye pigment and ferrous salts employed as substitution antigens in place of true malaria products, resembles Wassermann's reaction with its substituted antigen of lipoids. Is it purely a physicochemical reaction? The authors examined the sera of 9 patients which gave strong positive Henry's reactions, and found that the total protein content, the albuminglobulin ratio, and the blood cholesterol, were all within normal limits. These results, he concludes, are in favour of the biological, as opposed to the physical, conception of the reaction.

W. F.

JERMOLJEWA (Z. W.) & BUJANOWSKAJA (I. S.). Zur Frage der Malaria-Immunität. [**On Immunity in Malaria.**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1932. Vol. 73. No. 3/4. pp. 276–278. [Biochem. Inst., Public Health Commissariat, Moscow.]

The problem which the authors sought to solve was: whether in malaria there is a true immunity or only an "infection immunity," which is associated with the presence of the plasmodium in the organism. They attacked the problem by experiments with malaria in canaries. It was attempted to produce artificial immunity by plasmodia killed in various ways. They conclude that: (1) In malaria there is no sterilizing immunity, but an "infection immunity," that is, a latent infection which produces a resistance to reinfection; (2) By the introduction of various forms of killed plasmodia an artificial immunity was not obtained. (3) Treatment of malaria with various forms of killed plasmodia was valueless.

E. D. W. Greig.

* WELTMANN has described a method by which the coagulability of serum albumin can be followed in a graduated series of calcium chloride concentrations. Normal sera show a close approximation in their coagulation behaviour, the coagulation band (K.B.) extends from a calcium concentration of 0·5 to 0·4 per cent., that is, 6 or 7 tubes. In some diseases there is definite shortening, in others a definite lengthening of the K.B.

SWELLENGREBEL (N. H.) & DE BUCK (A.). **Prophylactic Use of Plasmoquine in a Dosage warranting Reasonable Safety for Routine Treatment.**—Reprinted from *Proc. Roy. Acad. Sci. Amsterdam.* 1931. Vol. 34. No. 8. pp. 1216–1220. With 1 chart in text. [10 refs.] [Royal Colonial Inst., Amsterdam.]

JAMES, NICOL and SHUTE (this *Bulletin*, Vol. 28, p. 973) have prevented malaria in persons subjected to the bites of heavily infected mosquitoes by means of a daily dosage of 6 centigrams of plasmoquine pure, given on the evening preceding infection, on the day of infection, and on the 5 succeeding days. The authors repeated this experiment, using *A. maculipennis* heavily infected with Colonel JAMES's Madagascar strain of *P. vivax*. Six centigrams a day is a dangerously high dose, consequently they gave 3 centigrams instead. This amount proved ineffective, nearly all the volunteers came down with fever three or four days after it was stopped. The authors however, say that their " subjects were bitten by numerous, heavily infected mosquitoes. It is quite likely that the chances of success would have been far better in the field than in our laboratory."

W. F.

JAMES (S. P.). **The Use of Plasmoquine in the Prevention of Malarial Infections.**—Reprinted from *Proc. Roy. Acad. Sci. Amsterdam.* 1931. Vol. 34. No. 10. pp. 1424–1425.

Referring to SWELLENGREBEL's paper, Colonel James suggests that the sporozoites of malaria, instead of entering the blood corpuscles, may undergo schizogony in the reticulo-endothelial cells like the sporozoites of " halteridium " in pigeons, and that plasmoquine may not act upon the sporozoites themselves, but upon the merozoites resulting from their schizogony. The results of his later experiments support this view. " Perhaps that may be the reason why it is necessary in order to obtain successful prophylactic results with smaller doses of plasmoquine than 6 cg. daily, to begin the administration some days before infection and to prolong it for more than five days thereafter." Experiments are proceeding to determine the smallest daily dose which will prevent infection and in these the drug is begun a week before exposure to infection, and continued for ten days after.

W. F.

JAMES (S. P.). La chimio-prophylaxie de la malaria. [**The Chemo-Prophylaxis of Malaria.**]—*Bull. Office Internat. d'Hyg. Publique.* 1931. Dec. Vol. 23. No. 12. pp. 2175–2178. [2 refs.]

This report is based upon the experiments of the author and his colleagues with plasmoquine in the prophylaxis of malaria [this *Bulletin*, Vol. 28, p. 973]. Quinine, and other cinchona derivatives, have an unfailing action on the asexual phase of the parasite which causes the symptoms of malaria, but they leave the sporozoites injected by the mosquito and the crescents untouched. Plasmoquine on the contrary has little action on the asexual forms of malignant tertian, but it destroys the crescents and the sporozoites, and thus has power to prevent the infection of both man and mosquito. It will therefore be of great value as a prophylactic in ships touching at malarious ports, for troops passing through malarious country, for explorers and the like.

W. F.

CLEMESHA (Wm. Wesley). **Further Note on Anti-malarial Measures on the Travancore Tea Companies' Estates.**—*Indian Med. Gaz.* 1931. Nov. Vol. 66. No. 11. pp. 618–622. [1 ref.]

The author reports the continued success of plasmoquine with quinine in a labour force under complete disciplinary control. (This *Bulletin*, 1931, Vol. 28, p. 576.) Up to the end of June 1929, there was much sickness from malaria; in spite of antilarval measures it was never less than 30 per cent. Plasmoquine anti-gametocyte after-treatment was started in the autumn of 1928, and the rate dropped to 10 per cent. per annum. In 1931 it dropped still further, to under 3 per cent. in three out of the author's five estates. "This rapid decline from 30 to 3 in two years cannot be accounted for by the anti-larval measures alone, though, of course, they have had an influence."

W. F.

i. WATSON (Malcolm); ii. CLEMESHA (W. W.). **Prophylactic Plasmoquine on a Tea Estate.** [Correspondence.]—*Lancet.* 1931. Dec. 26. pp. 1432–1433; 1932. Apr. 2. p. 750.

i. The writer criticizes the above report by Col. CLEMESHA, and also a previous one, concerning the same group of estates, by CLEMESHA and MOORE (this *Bulletin*, 1931, Vol. 28, p. 576). He is of opinion that there are regions where drugs should be used to supplement antilarval measures, and that, in some, treatment with drugs is the method of choice, but he considers that Col. CLEMESHA's reports are so misleading that they do not help us to get nearer to the truth about the value or limitations of either plasmoquine or antilarval measures. He visited these tea estates in April 1929, and found that, on some of them, the antilarval work was very inefficient; he therefore recommended that thorough measures should be undertaken over an area of a quarter mile radius around each centre, this area being extended if necessary. The improvement in health which followed was the result of the better organization of the antilarval work and not the result of plasmoquine. The report of CLEMESHA and MOORE, and the note above by CLEMESHA "contain statements which . . . are not true in fact; and they omit information without which it is impossible to estimate the relative value of the various factors which led to the improved health of the estates."

ii. In reply, Colonel Clemesha states that Sir Malcolm WATSON spent only five or six days on these estates, and that he did not appear to consider the oiling of such very great importance at the time for, in answer to a request for a copy of his report, he wrote "I have not made any written report. I think my only recommendations were that a definite area of a quarter of a mile round the lines should be selected and controlled . . . and . . . on one of the estates some land should be acquired from the Government to complete the control work." The area oiled was only increased in two estates, yet all showed improvement in the health figures, and Colonel Clemesha states that these two estates can be omitted from the calculations without upsetting his conclusions. He asks Sir Malcolm WATSON "What was the cause of the complete breakdown of his oiling measures on the estates in the Federated Malay States in 1926?"

W. F.

KINGSBURY (A. Neave) & AMIES (C. Russell). **A Field Experiment on the Value of Plasmoquine in the Prophylaxis of Malaria.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1931. Nov. 30. Vol. 25. No. 3. pp. 159–172. With 2 figs. [6 refs.] [Inst. for Med. Research, Kuala Lumpur.]

[It has beeen shown that the viability of gametocytes can be destroyed by minute doses of plasmoquine, and that patients can thus be rendered non-infective to mosquitoes; but the elimination of malaria in any community by this method depends on the extent to which that community is under control (see this *Bulletin*, BARBER, 1929, Vol. 26, p. 939; WHITMORE, 1931, Vol. 28, p. 107; AMIES, *ibid.* p. 599; also CLEMESHA, *ibid*, p. 576).]

"1. Plasmoquine was given in an adult dose of 0·04 grammes (0·9 mg. per kilogram body weight) twice weekly to a population of about 330 on a Rubber Estate where the incidence of malaria had been high for many years.

"2. At regular intervals of three months surveys were carried out to determine the malaria parasite rate (thick film method), the spleen rate, and the average haemoglobin value of the population on this Experimental Estate. Surveys of anopheline breeding places were also carried out at the same time.

"3. Similar surveys were carried out at the same times on two contiguous Control Estates with populations of 405 and 362.

"4. The experiment was continued for a period of twelve months.

"5. The effect of plasmoquine prophylaxis on the incidence of clinical malaria was marked. In the year preceding the experiment the subtertian and benign tertian cases numbered respectively 30·4 and 52·5 per cent. of the population. Throughout the experimental period of twelve months, the incidence was 7·0 and 8·7 per cent. for subtertian and benign tertian infections respectively.

"6. From the parasite rates alone, the results were somewhat inconclusive, since the Control Estates showed a fall in the number of blood infections equal to that found on the Experimental Estate. Towards the end of the experiment, no *P. falciparum* gametocyte carriers could be found on the Experimental Estate.

"7. From the parasite rates only, it appears that the method was perhaps less satisfactory for benign tertian than for sub-tertian infections. This may possibly be due to plasmoquine having a less marked gametocidal action on *P. vivax*.

"8. There was slight improvement in the splenic index and in the average haemoglobin percentage, but the improvement in the general physical condition of the labourer was most satisfactory. This observation was confirmed by the sickness rate which fell by 51 per cent. on the Experimental Estate, as compared with the previous year. On Control Estate I, the sick rate fell by 11 per cent. during the same period, but there was an increase of 21 per cent. in the sick rate on Control Estate II.

"9. The cost of this method of prophylaxis is about $600 (Straits Settlements) or £70 per annum per 100 labourers, including treatment of the average number of dependents."

W. F.

DE MELLO (Froilano) & BRAS DE SA. La plasmoquination en masse des localités malariennes et ses résultats prophylactiques. [**Prophylactic Plasmoquine in Malarious Places.**]—*Bull. Soc. Path. Exot.* 1931. Oct. 14. Vol. 24. No. 8. pp. 649–656. [7 refs.]

The isolated village of Codal was selected for this experiment. It was highly malarious; the splenic index was 82·7 per cent., and the

population was untreated. Antilarval treatment of mosquito breeding places with Paris green was carried out for three weeks, and mosquito traps were put in the houses and stables. The Paris green was then discontinued. The inhabitants were treated for about four weeks—with appropriate intervals of rest—with 0·03 gram of plasmoquine and 0·5 grams of quinine daily. Subsequently they were given one day's treatment every week, and this supplementary treatment was continued for 2½ months unaccompanied by any antilarval work. The results were most encouraging; the splenic index fell from 82·7 to 27·2 and, instead of half the population being incapacitated with fever, there was scarcely a case to be found although the disease was as bad as ever in the surrounding villages. Subsequently there was a large influx of labourers from malarious districts which was soon followed by fresh cases among the inhabitants, and the authors point out that if mass prophylactic treatment is to be a success, one must have power to examine, and to treat if necessary, all new-comers to a district.

W. F.

KLIGLER (I. J.) & MER (G.). **Periodic Intermittent Treatment with Chinoplasmine as a Measure of Malaria Control in a Hyperendemic Area.**—*Riv. di Malariologia.* 1931. July-Aug. Vol. 10. No. 4. pp. 425–438. With 1 chart in text. [4 refs.] [Hyg. Dept., Hebrew Univ., Jerusalem.]

About 900 persons, the inhabitants of five villages near an *A. elutus* breeding area, were treated with "chinoplasmine," consisting of 0·9 grams of quinine and 0·03 grams of plasmoquine daily, with proportionately lower doses for children. Three five-day courses were given at intervals of two weeks. "Both the incidence of human and mosquito infection was reduced to about one-third of that normal for the area. . . . The mixture was far less efficacious in children below 4 years. . . . While the immediate effect of the treatment was good, a considerable number of cases relapsed within two weeks. . . . Repeated treatment tends to increase the resistance of the parasites to the drug."

W. F.

KAISER (L.). Chinine- en Chinoplasminprophylaxis. [**Quinine and Quinoplasmine Prophylaxis.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1931. Nov. 15. Vol. 71. No. 16. pp. 1355–1357.

The same military patrol visited a malarious part of South Celebes on three occasions. On the first occasion quinine was administered prophylactically, but notwithstanding, 11 out of 21 men got malaria. On the two other occasions quinoplasmine only was given once and the other time quinine to one half of the men and quinoplasmine to the other half. On the last occasion one case of tertian fever (relapse) occurred. The author appears very satisfied about these results and about the absence of by-effects during the use of quinoplasmine, which therefore does not interfere with the military value of the patrol.

[Yet the superiority of quinoplasmine over quinine in this respect is by no means proven, as on the first occasion the last dose of quinine (0.6 gm. of the hydrochlorate) before the outbreak of the disease was administered the day after the patrol left the highest infected spot, i.e. probably in the early beginning of the incubation period.]

W. J. Bais.

"Greenglide" (Reg. No. 523450) Floatable Paris Green in Malaria Control.—1931. Dec. Bull. No. 316. 2 pp. Issued by W. J. Craven & Co. Ltd., Manufacturing Horticultural Chemists, Evesham. In Association with Hoyle, Robson, Barnett & Co., Ltd., Newcastle-on-Tyne.

The above firm of horticultural chemists, at Evesham, have issued a pamphlet describing a form of Paris green which they have put on the market under the name of "Greenglide." The great advantage which it is said to possess over ordinary Paris green is that it will float for weeks. "It answers to the following specification :—

Arsenious oxide $As_2 O_3$, ...	55·37	per cent.
Copper oxide Cu O	31·12	,,
Water soluble arsenic (Max.)	1·0	,,

The actual cost of Greenglide is in line with the price charged for the ordinary commercial Paris green." A second pamphlet illustrates the different types of blower recommended for use with "Greenglide."

W. F.

SYMES (C. B.). **Observation on *Anophelines* and Malaria in Kitale, with Notes on Experimental Control with Paris Green.**—*Kenya & East African Med. Jl.* 1931. Dec. & 1932. Jan. Vol. 8. Nos. 9 & 10. pp. 256–267 ; 280–283. [2 refs.]

In 1929, at the suggestion of Lt.-Col. S. P. JAMES, it was decided to experiment with Paris green as a substitute for oiling. Kitale was chosen as a suitable area ; its long stretches of jungle-covered streams, which could not be effectively treated with oil, provided excellent testing grounds. The principal carriers are *A. costalis* and *A. funestus* ; the anopheline season coincides with the long wet season. The diluting powder was dust from the Elgon caves. Paris green was cheaper than oiling, but, though the experiment had promising results, it proved by no means a satisfactory method of control in Kitale.

W. F.

MARTINI (E.). Das Bestäubungs-, besonders Schweinfurtergrün-Verfahren in der Malariabekämpfung. [**Paris Green as an Anti-Malarial Measure.**] —Reprinted from *Ztschr. f. Desinfektions- u. Gsndhtwesen.* 1931. No. 4. pp. 151–166. [52 refs.] [Inst. for Ship & Trop. Diseases, Hamburg.]

A useful survey of the literature of the subject.

E. D. W. Greig.

KANDELAKI (S.). Splenographie und Milzindex ("Splenometrie"). [**Splenometry.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1932. Feb. Vol. 36. No. 2. pp. 74–77. With 6 text figs. [Trop. Inst. of Georgia, Tiflis.]

The author describes his method of estimating the spleen index. No reference is made to the important work of Christophers on measurements of size of spleen ; no corrections are given for sitting height, nipple-umbilicus line or age.

E. D. W. Greig.

MALARIA (CORRESPONDENCE).

NIEUWENHUIS (A. W.). Die Entstehung der Polynesier und ihrer Kultur. Der Einfluss endemischer Malaria in Ozeanien. [**Influence of Endemic Malaria in Oceania.**]—*Acta Leidensia* (*Scholae Med. Tropicae*). 1930. Vol. 5. pp. 128–192.

Dr. P. A. BUXTON after perusal of the summary of this paper published in this *Bulletin*, Vol. 28, p. 986 writes to ask whether it is clear in the original paper that there is no malaria in Polynesia. Colonel GREIG (the reviewer) has replied that this is clear, and that the author, in dealing with the influence of endemic malaria in Oceania, compares the culture of the malaria-free Polynesian with that of his neighbours in those parts of the South Sea where malaria is found.

ASSELIN. Sur un cas de paludisme autochtone observé dans le centre urbain de Hanoi.—*Bull. Soc. Méd.-Chirurg. Indochine.* 1931. Oct. Vol. 9. No. 9. pp. 733–734.

BARRETO (Castro). Indice endemico da malaria na zona de Curumarim (D. Federal).—*Brasil-Medico.* 1932. Jan. 9. Vol. 46. No. 2. pp. 33–34. [2 refs.]

v. BERKESY (L.). Ueber die Entstehung der Malariainfektionen im Vorfrühling. Erwiderung auf obige Bemerkungen von Herrn Fr. Fischl zu der gleichnamigen Mitteilung in Nr. 35 der Zeitschrift.—*Wien. Klin. Woch.* 1932. Feb. 12. Vol. 45. No. 7. pp. 209–210.

BIGGAM (A. G.). Malaria and its Treatment.—*Jl. Roy. Army Med. Corps.* 1931. Oct. Vol. 57. No. 4. pp. 283–290. With 2 text figs.

BONALBERTI (E.). Contributo allo studio della reazione di Henry nella diagnosi clinica di malaria.—*Boll. Instituto Sieroterap. Milanese.* 1931. Nov. Vol. 10. No. 11. pp. 711–719. [7 refs.] English summary. [Provincial Lab. of Hyg. & Prophylaxis, Ferrara.]

BORDES (L. A.) & NGUYEN-VAN-LIENG. Note sur les albumines et la cholestérine du sérum sanguin chez les paludéens chroniques de race annamite.—*Bull. Soc. Path. Exot.* 1931. Oct. 14. Vol. 24. No. 8. pp. 724–731. [18 refs.] [Pasteur Inst., Saigon.]

BOURGUIGNON (G. C.) & PEEL (E.). Note préliminaire relative à l'administration de plasmochine associée à la quinine en vue de l'assainissement des regions impaludées de tierce tropicale.—*Ann. Soc. Belge de Méd. Trop.* 1931. Aug. 31. Vol. 11. No. 3. pp. 257–274.

CAMPUNAUD. Au sujet de quelques cas de paludisme autochtone constatés à Hanoi.—*Bull. Soc. Méd.-Chirurg. Indochine.* 1931. Oct. Vol. 9. No. 9. pp. 735–738.

CARDAMATIS (J. P.). A propos des nouvelles théories sur le paludisme. (On New Theories on Malaria.)—*Riv. di Malariologia.* 1931. May-June. Vol. 10. No. 3. pp. 311–320. English summary p. 420. [School of Malariology, Athens.]

CHUKERBUTI (J. C.). Cross Fertilization among Malarial Parasites.—Reprinted from *Antiseptic.* 1931. Sept. Vol. 28. 3 pp. With 1 text fig. [Indian Milit. Hosp., Trimulgherry.]

CONSOLI (Nicolò). Gli interventi di piccola bonifica nella lotta antimalarica in Sicilia. L'azione spiegata dal Provveditorato alle Opere Pubbliche dall' anno 1926 all' anno 1930—II. Relazione.—*Riv. Sanitaria Siciliana.* 1931. Sept. 15. Vol. 19. No. 18. pp. 1303–1359. With 34 figs. and 2 graphs.

COULON (G.) & SAUTET (J.). Diverses formes du paludisme en Corse. Apparition des gamètes.—*Bull. Soc. Path. Exot.* 1931. Nov. 12. Vol. 24. No. 9. pp. 811–817. With 1 chart in text. [2 refs.]

EJERCITO (Antonio). Malaria in Cardona-Look, Rizal, during 1928 and 1929.—*Monthly Bull. Philippine Health Serv.* 1931. Jan. Vol. 11. No. 1. pp. 13–19. [4 refs.]

ESTAS & SAMBON. Recherches quantitatives des index splénique, malarien et gamétien, chez la population infantile du Camp de Panda.—*Bull. Méd. du Katanga.* 1931. Vol. 8. No. 4. pp. 101–104.

ESTAS & SAMBON. Notes sur diverses circonstances accompagnant l'éclosion de la malaria chez les travailleurs U.M.—*Bull. Méd. du Katanga.* 1931. Vol. 8. No. 4. pp. 107–109.

FISCHER (Otto). Die Bedeutung der modernen Malariaheilmittel für die Bekämpfung des Wechselfiebers.—*Klin. Woch.* 1931. Dec. 5. Vol. 10. No. 49. pp. 2266–2269.

FISCHL (Friedrich). Bemerkungen zu dem Artikel : Ueber die Entstehung von Malariainfektionen im Vorfrühling von L. v. Berkesy.—*Wien. Klin. Woch.* 1932. Feb. 12. Vol. 45. No. 7. pp. 208–209.

FISK (G. H.). Malaria and the Anopheles Mosquito in Canada.—*Canadian Med. Assoc. Jl.* 1931. Dec. Vol. 25. No. 6. pp. 679–683. [5 refs.]

FRANCHINI (G.) & GANORA (R.). Casistica clinica ed ematologica delle varie forme di malaria dominanti nel bassopiano dell' Eritrea.—*Arch. Ital. Sci. Med. Colon.* 1931. Oct. 1. Vol. 12. No. 10. pp. 589–594. English summary (6 lines). [Inst. of Colonial Path., Univ., Modena.]

FREEMAN (Walter). Therapeutic Malaria in Private Practice.—*Southern Med. Jl.* 1931. Nov. Vol. 24. No. 11. pp. 933–936. [1 ref.]

GALLETTI (Dante). La ricerca del parassita malarico col metodo dell' arricchimento.—*Policlinico.* Sez. Prat. 1931. Oct. 19. Vol. 38. No. 42. pp. 1541–1543. With 1 text fig. [1 ref.]

HUART (A. J.). Malaria en appendicitis.—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1931. Dec. 1. Vol. 71. No. 17. pp. 1420–1424. [7 refs.]

JEMMA (R.). Klinische Feststellungen ueber die Malaria der Kinder.—*Arch. f. Kinderheilk.* 1932. Feb. 5. Vol. 95. No. 3/4. pp. 227–241.

KING (H. H.). A Note on the Expectation of the Relative Prevalence of Plasmodial Species when this is based solely on the Relative Output of Gametocytes.—*Indian Jl. Med. Res.* 1931. Oct. Vol. 19. No. 2. pp. 353–356.

KORTEWEG (P. C.). What is the Normal Type of Fever in the Primary Cases of Benign Tertian Malaria ? Is it Tertian or Quotidian ? With a Note by Lt.-Col. S. P. JAMES.—*Jl. Trop. Med. & Hyg.* 1931. May 15. Vol. 34. No. 10. pp. 129–131.

DE LAGOANÈRE (Joseph Marie Jean Louis) & ARÈNE. Considérations sur le paludisme.—*Arch. Méd. et Pharm. Milit.* 1931. Nov. Vol. 95. No. 4. pp. 373–401.

LANE (Clayton). Housing and Malaria.—*Jl. Trop. Med. & Hyg.* 1931. Dec. 15. & 1932. Jan. 1. Vol. 34. No. 24 & Vol. 35. No. 1. pp. 405–411 ; 4–12. With 4 text figs. [2 pages of refs.]

LOI (Libero). L'infezione malarica e tubercolare in regione malarica. (Contributo anatomopatologico.)—*Riforma Med.* 1931. Nov. 16. Vol. 47. No. 46. pp. 1740–1742. [Inst. of Path. Anat., Univ., Cagliari.]

LUTRARIO (Alberto). Attività della Commissione internazionale della malaria durante il 1930 e il 1931. Activities of the International Malaria Commission during 1930 and 1931.—*Riv. di Malariologia.* 1931. Sept.–Oct. Vol. 10. No. 5. pp. 611–627. English summary (7 lines). p. 672.

MACDONALD (G.). The Significance of the Various Degrees of Splenic Enlargement in Malarious Communities.—*Records of the Malaria Survey of India.* 1931. Dec. Vol. 2. No. 4. pp. 569–602. With 11 figs. [19 refs.]

MAGGIORA-VERGANO (Romano). L'attività della Scuola di igiene rurale e di profilassi antimalarica di Nettuno. (The Activities of the Rural School of Hygiene and Antimalarial Prophylaxis of Nettuno.)—*Riv. di Malariologia.* 1931. July–Aug. Vol. 10. No. 4. pp. 499–511. With 2 figs. and 1 map in text. English summary (5 lines) p. 542.

MESNARD (J.) & BORDES (L. A.). Note sur le taux d'infestation palustre de la main-d'oeuvre importée à son arrivée en Cochinchine.—*Bull. Soc. Méd.-Chirurg. Indochine.* 1931. June. Vol. 9. No. 6. pp. 492–497. [Pasteur Inst., Saigon.]

MORIN (H. G. S.). Sur le mode le plus probable de la transmission du paludisme à Hanoi. Déductions prophylactiques.—*Bull. Soc. Méd.-Chirurg. Indochine.* 1931. Oct. Vol. 9. No. 9. pp. 739–745. [Pasteur Inst., Hanoi.]

MORIN (H.) & MESNARD (J.). Nouveaux faits relatifs à la réceptivité naturelle des anophèles d'Indochine à l'hématozoaire du paludisme.—*Bull. Soc. Path. Exot.* 1931. Dec. 9. Vol. 24. No. 10. pp. 919–923.

MORISHITA (Kaoru). Notes on Mixed Malarial Infection, with Special Reference to Antagonism among Different Species of Malarial Parasites and their Segregation by the Use of Special Drugs.—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1931. Sept. Vol. 30. No. 9 (318). [In Japanese. English summary pp. 68–70.] [Govt. Research Inst., Formosa.]

NERI (Filippo). Nuovi metodi curativi della malaria. (New Antimalarial Methods of Treatment.)—*Riv. di Malariologia.* 1931. July-Aug. Vol. 10. No. 4. pp. 465–498. [5 pages of refs.] English summary (7 lines) p. 542.

NICOLAU (C. T.) & GINGOLD (N.). Modifications hématologiques pendant lés accès de malaria.—*Arch. Roumaines Path. Expérim. et Microbiol.* Paris. 1931. Mar. Vol. 4. No. 1. pp. 119–134. With 8 charts in text. [22 refs.] [2nd Med. Clinic. & Hyg. Inst., Bucharest.]

PECORI (G.) & ESCALAR (G.). Relazione sulla campagna antimalarica dell'anno 1930.—Report on the Anti-Malaria Campaign during 1930 in the Agro Romano.—*Riv. di Malariologia.* 1931. Sept.–Oct. Vol. 10. No. 5. pp. 545–610. With 18 text figs. English summary p. 671. [Health & Sanitation Office, Rome.]

PIRAMI (Ester) & TASSI (Goffredo). Sugli effetti della chinoplasmina nella malaria estivo-autunnale in Eritrea.—*Arch. Ital. Sci. Med. Colon.* 1932. Jan. 1. Vol. 13. No. 1. pp. 32–39. English summary (4 lines). [Inst. of Colonial Path., Univ., Modena.]

POZZI (Arnaldo). La malarioterapia mediante anofeli. Utilità di istituzione di centri di allevamento e di infestazione degli anofeli per la diffusione della malarioterapia.—*Policlinico.* Sez. Prat. 1931. Dec. 21. Vol. 38. No. 51. pp. 1887–1892. With 1 text fig. [14 refs.] [Inst. of Clin. Med., Univ., Rome.]

PRIEST (R. C.). A Case of English Malaria.—*Jl. Roy. Army Med. Corps.* 1931. Dec. Vol. 57. No. 6. pp. 448–449. With 1 chart in text.

REBAGLIATI (Raul). Conceptos sobre virulencia e inmunidad en el paludismo.—*Cronica Méd.* Lima. 1931. Aug. Vol. 48. No. 818. pp. 251–255.

SELWYN-CLARKE (P. S.). The Seasonal Prevalence of Malaria in the Federated Malay States.—*Malayan Med. Jl.* 1931. Sept. Vol. 6. No. 3. pp. 67–81. With 7 charts. [25 refs.]

SERRA (V.). Sulla patogenesi delle manifestazioni esantematiche ed emorragiche e degli edemi nel corso dell' infezione malarica. (Eczematous, Hemorragic and Edematous Syndromes in Malarial Patients.)—*Riv. di Malariologia.* 1931. July–Aug. Vol. 10. No. 4. pp. 439–458. [2 pages of refs.] English summary (4 lines) pp. 541–542. [Inst. of Specialized Med. Path., Univ. Rome.]

SINTON (J. A.). Reports on Some Short Malaria Surveys undertaken in Kathiawar. —*Records of the Malaria Survey of India.* 1931. Sept. Vol. 2. No. 3. pp. 349–405. With 4 charts. [2 refs.]

SURBEK (K. E.). A Striking Case of Quartana-Nephrosis.—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1931. Nov. 30. Vol. 25. No. 3. pp. 201–204. With 2 text figs. [12 refs.]

SWELLENGREBEL (N. H.), ANNECKE (S.) & DE MEILLON (B.). Malaria' Investigations in Some Parts of the Transvaal and Zululand.—*Publications of South African Inst. Med. Res.* 1931. July. Vol. 4. No. 27. pp. 245–274. With 5 graphs, 12 figs. and 1 map on 9 plates and 1 folding map. [9 refs.]

TIROUVANZIAM & LE-VAN-XUYEN. Le paludisme à Kampot.—*Bull. Soc. Méd.-Chirurg. Indochine.* 1931. Sept. Vol. 9. No. 8. pp. 620–632.

TOULLEC, ALAIN & JOLLY. Anémie pernicieuse paludéenne.—*Bull. Soc. Path. Exot.* 1931. Dec. 9. Vol. 24. No. 10. pp. 912–915.

VARGAS (Abel). Malaria. Recaidas ou reinfecções ?—*Brasil-Medico.* 1931. Nov. 14. Vol. 45. No. 46. pp. 1066–1068.

ZANETTI (V.). Note préliminaire sur la lutte anti-malaria et anti-moustiques à Léopoldville.—*Ann. Soc. Belge de Méd. Trop.* 1931. Aug. 31. Vol. 11. No. 3. pp. 349–366. With 9 text figs.

PLAGUE.

League of Nations Monthly Epidemiological Report. 1931. Sept. 15. Vol. 10. No. 9. pp. 337–356. With 2 figs. & 7 maps. [Refs. in footnotes.]—**Plague in 1930–31.** [In parallel French and English.]

This world-wide review of plague refers to the period January 1930 to June 1931. The incidence of plague in the year 1930 was comparatively light; the notified cases were less than the number recorded in 1929 and a third of those recorded in 1928. The chief cause of this reduction was the decrease of the disease in British India; Java and Madagascar, two well-known plague centres, showed no change. The following notes refer to observations which seem to merit attention.

Plague still lingers among the native tribes in Morocco, but there has been no outbreak so severe as that which in 1911 ravaged the Doukkala tribes to the south-west of Casablanca, and caused more than 10,000 deaths. A mixed outbreak, in which pneumonic plague predominated, appeared along the course of the railway from Philippeville to Biskra and prevailed during January 1931; there were in all 76 deaths.

In December 1929 pneumonic plague broke out in Tunis among the immigrants of a tribe from the South, who worked in the city as porters; 53 persons died within a fortnight. Nearly all of these immigrants were quarantined, with the result that the epidemic was promptly brought to an end, although there were 18 cases among the "contacts" in the isolation hospital.

In Egypt the prevalence of plague has declined steadily since 1923, when it reached the high level of 1519 cases and 725 deaths. During 1931 the Dairut and Manfalut districts of the Province of Asyut and the Province of Giza yielded the greatest number of cases: the recent incidence upon Lower Egypt and in particular Alexandria has been unusually mild. Anglo-Egyptian Sudan still remains free from plague, in contrast with the neighbouring territory of Uganda, where from 1910 to 1930 inclusive, 57,000 deaths were notified. Plague is increasing in Kenya, for during the first 8 months of 1931 no fewer than 1758 cases were recorded. There is an infected but limited area in the mountains of the Eastern Province of Belgian Congo at an altitude of about 5,800 feet; here the pulmonary form is the most common (44 per cent.).

In the period July 1930–June 1931, in Madagascar plague increased from 1,710 cases with 1,584 deaths in 1929–1930 to 2,436 cases with 1,979 deaths. In December 1930 479 cases were reported—the highest monthly figure recorded for some years. A peculiar feature of plague in Madagascar is the constant proportion of pulmonary cases from year to year.

In Iraq plague is confined, with few exceptions, to the City of Baghdad, where in 1930 there were 109 cases and 51 deaths.

The reduction in British India has been considerable, for in 1930 only 23,825 deaths were reported as compared with 69,572 in 1929 and 135,647 in 1928; the Punjab has shown a striking improvement. In Bombay there were only 27 cases in 1930 and 25 cases during January-September 1931.

Java remains one of the chief centres of plague in the world. The infection gained access through the port of Surabaya, and has taken root chiefly in the central mountainous region, an experience which is

similar to that of the Deccan in India, Madagascar, Kenya and the Belgian Congo.

During 1930 Transbaikalia, the endemic focus of plague where the infection is maintained in the tarbagan (marmot), apparently remained free from human plague. During 1930–1931 no cases were reported from Hong Kong.

Australia has been free from plague since the year 1923.

In Europe a few cases were notified from Greek and French ports. In the port of Marseilles during 1930, there were 14 human cases of plague of which 2 were imported, and a considerable number of plague rats were found; whereas in the first six months of 1931 there were no human cases, and only a small number of plague rats.

There are at least two references in this report to the probable occurrence of the transmission of plague from man to man by the human flea. Thus BLOCH thinks that in Tunis there is a "maritime" plague, generally bubonic, and related to rat plague in ports; and a "rural" plague which takes either the pulmonary form or the septicaemic and the bubonic form and is conveyed through the medium of flea-bites [presumably human fleas]. The other reference mentions the excessive flea infestation of the native huts in the western part of Senegal, even after the huts have been razed by fire. This circumstance, together with the comparatively low incidence of rodent plague, is said to suggest inter-human transmission by means of [human] fleas. The reviewer's experience does not favour this theory and he regards evidence of this kind that has come to his notice as being of doubtful validity.

G. F. Petrie.

HIRST (L. F.). **Report on the Protection of the Interior of Ceylon from Plague with Special Reference to the Fumigation of Plague-Suspect Imports.**—*Colombo Rep. XXV of Med. Officer of Health for Year 1930.* Annexure C. pp. 46–92. With 4 diagrams and 4 figs. on 2 plates. [45 refs.]

In this Report Dr. Hirst describes how plague infection is introduced into Ceylon through the port of Colombo and how, as a result, there is, in his opinion, a considerable risk of the infection taking root in the interior of the island. He devotes a good deal of space to a discussion of the efficacy of HCN gas as a disinfesting agent for ships and their cargoes. The mass of detailed information in the Report cannot be adequately summarized here, but the following points of interest may be noted.

The infection was brought into Colombo in shipments of rice from Rangoon 17 years ago. This city is the port of shipment for most of the half million tons of rice and the 50,000 tons of grain of various kinds which are imported annually into Ceylon. Much of the rice is consigned to the highland tea-planting estates, which are 1,500 to 5,000 feet above sea-level. As a consequence *X. cheopis* has been introduced, and has become a well-established ecto-parasite of the rats in the "boutiques." The climatic conditions are favourable to the spread of plague, and thus there is a danger that the infection may become endemic in the upland districts. Moreover there is a risk of an epizootic spreading among the field rodents and establishing a rural focus like those which have been found in many other countries.

Rangoon and Bombay constitute the two chief sources of infection

for Ceylon, although the measures which have been taken within recent years against rats, for example, rat-proofing and structural improvements of warehouses, have brought about a striking reduction in the incidence of plague in these cities. Rangoon is the more important source, and here the infection has been traced to the highly rat-infested rice mills and rice stores, which are to be found on the banks of small tributaries of the Rangoon river. Thence the rice is conveyed by rat-infested lighters to ships in the river and thus to Colombo. Most of the fleas in the rice mills are carried by *Gunomys bengalensis*, the mole-rat, but 92 per cent. of the fleas of this rodent are *X. astia*, a species which is less dangerous as a plague carrier than *X. cheopis*, and less readily transported overseas. *R. concolor*, *R. rattus*, and *Mus musculus* are the important rodents in the mills, because they carry mostly *X. cheopis*, and because each is subject to plague. In Rangoon city the mole-rats and *R. norvegicus* are outdoor animals, and their fleas consist largely of *X. astia*, whereas *R. concolor*, *R. rattus* and *M. musculus* live for the most part within houses, and are infested with *X. cheopis*.

Rangoon and Bassein seem to be the only ports in Burma in which plague is definitely endemic: Moulmein, a port in which *X. astia* is the predominating species of flea on the rodents, is much less severely affected, and Akyab, where also *X. astia* is the chief species, is almost free from plague. Observations have recently been made on the rat and rat-flea infestation of ships in the port of Rangoon; 87 ships yielded 461 rats from which 975 fleas were taken, and of these 94 per cent. were *X. cheopis* and 6 per cent. were *X. astia*. In August 1928 a rat-flea survey of ships moored in Colombo harbour was begun, with the result that 133 ships yielded 737 rats and 1,743 fleas, of which 95 per cent. proved to be *X. cheopis* and 5 per cent. were *X. astia*.

The author thinks that attention should be concentrated on rice, grain, and cotton as the important media for the introduction of rat-fleas. Recent observations in Colombo and Madras city indicate that cotton is particularly liable to harbour rat-fleas. Thus the only premises in these cities where *X. cheopis*—an alien flea—is found in large numbers on rats are mills which store cotton that has come from localities in which the rats are infected with *X. cheopis*.

In Colombo, despite energetic rat-control measures such as the construction of modernized rat-free warehouses and regular rat-catching operations, the rat population is still fairly large and plague epizootics have occurred. Nevertheless the author recommends the adoption of intensive measures for rat destruction on the harbour front by means of trapping and the laying of baits containing barium carbonate. He refers, apparently with approval, to the suggestion made by Dr. C. G. Crow, the Port Health Medical Officer of Rangoon, that cyanide fumigation of ships moored in the ports of Rangoon, Colombo and Singapore which show signs of excessive rat infestation or of plague infection should be entrusted to a fumigation Company under official supervision. The fumigation of all the rice and other grains which are brought to Colombo from plague-infected ports is scarcely practicable under existing circumstances; only the really dangerous consignments can be treated in this way.

Hydrogen cyanide gas is the most efficient agent for the destruction of rats and rat-fleas that has been tested up to the present. The author carried out a number of tests, employing laboratory apparatus on a small scale, to ascertain the ability of HCN gas to penetrate rice grains

and to cause rat-fleas to burrow into the rice in order to escape from the poisonous action of the gas. An experimental tunnel was constructed, into which bags containing various grains were put; a forced draught of air impregnated with HCN gas was passed through the tunnel, and the effect on rat-fleas, which were placed in each bag for the purpose of serving as an indicator of lethal action, was noted. These insects are extremely sensitive to the presence of small concentrations of HCN. Similar experiments were carried out in lighters with the aid of a Liston Cyanide fumigator. The results were satisfactory.

G. F. Petrie.

WU LIEN TEH [M.A., Md., B.C. (Cantab.), M.D. (Tokio), Hon. Litt. D. (Peking): LL.D. (H'kong): Sc.D.: C.P.H. (J'Hopkins), Director & Chief Medical Officer of the Service, etc.] [Edited by]. **Reports 1929–1930. Manchurian Plague Prevention Service. Being Volume VII of the Series.**—pp. v+233. Ill. [A fuller review appears in *Bulletin of Hygiene.*]

This volume, the seventh of the series of reports of the Manchurian Plague Prevention Service, is full of interest. Of the 34 items presented half are reprints of articles which have appeared elsewhere, 9 others are annual reports of hospital activities and consequently of topical rather than of general importance. Seven are concerned with plague. Dr. Wu Lien Teh, Director of the Service, contributes a short preface. He notes that the tarabagan regions, where for the last ten years there have been almost annual manifestations of the disease, were entirely quiescent during the 1929–30 season and ascribes this largely to destruction of these rodents in recent years. The focus newly discovered in 1927–8, in the Tungliao district, South Manchuria, continued to be a source of anxiety and the organization consequently closed in part certain stations in North Manchuria and opened new ones in Tungliao and Chengchia-tun, in South Manchuria. The staff was also engaged in investigating a limited outbreak of cholera in Shanghai. The Plague Prevention Service, by a decree of the National State Council of April 4th 1931, now comes under the Central Health Administration of the Ministry of Interior, Nanking.

Of the seven articles dealing with plague, the first, on Rodents of Manchuria and Mongolia and their Significance in Disease, is a reprint from the *Natural History Bulletin of the Peking Society.* It is shown that the problem of plague in these regions is complicated. In Transbaikalia, Mongolia and adjacent parts of North Manchuria the tarabagan plays the chief rôle in the spread of plague to man and researches carried out in the Harbin laboratory show that it is owing to these animals harbouring the disease during hibernation that infection is carried from one plague season to another. Some of the smaller field rodents were also found infected. In Tungliao the domestic rats suffer from plague and are concerned in its spread; the question whether they derive it from wild rodents is undecided and is to be further studied.

Next follows a paper on Surgical Aspects in the Treatment of Bubonic Plague, reprinted from the *Proceedings of the Honolulu Conference.* The subjects of early incision or excision are discussed and the value of antiserum.

Certain investigations during the Tungliao outbreak in August 1929 form the subject of the third article. Research work was considerably

hampered by the fact that outbreaks often occurred simultaneously in several, widely separated, villages. Large numbers of fleas were collected from dogs in infected villages, but, strange to say, all proved to be *Pulex irritans*, none were *Ctenocephalus canis*. None of the Pulex, however, was found infected, even though collected from men, dogs and the sleeping platforms of plague-infected houses; whereas all the *X. cheopis* caught in the clothes or on these platforms had *P. pestis* in their alimentary tracts. At the beginning of the report are three beautifully coloured plates showing in longitudinal sections of the fleas the stages of infection and growth of organisms. Even in a hut where human plague had not yet occurred (though they did arise some days afterwards) all the Xenopsylla collected were infected.

In a brief abstract of a long paper on Mites as Plague Carriers, which appeared *in extenso* in *Zoologische Jahrbuecher*, 1930, it is concluded that none of the 9 species mentioned and described played any important part in spreading an epidemic, even though the epidemic is the result of one epizootic among the rodents on which the mites were found.

The remaining three papers deal with the disease in South Manchuria and in the Tungliao area in particular. This area is an extensive one between Inner Mongolia on one side and Manchuria proper on the other, and plague is now endemic there. Infected rats enter from Mongolia, fleas are introduced by travellers and in their luggage, and also in cargoes. What part wild rodents play is not known, for none has been found naturally infected. The 1927–8 outbreak caused some 600 deaths.

The sites of the buboes were in the proportions roughly of 3 femoral and inguinal, 2 axillary, 1 cervical, but 19·5 per cent. presented no buboes—septicaemic cases; there were no pneumonic.

The main features of the South Manchuria outbreak (apart from Tungliao), were that small villages at short distances from the railways were chiefly involved; the type was largely bubonic. Many, in fact the majority, were not seen by doctors and were heard of only after the outbreaks had spontaneously subsided. The fatality rate appeared to be high, but exact figures were not obtainable.

H. H. S.

Ando (K.), Kurauchi (K.) & Nishimura (H.). Une nouvelle région de peste endémique dans la partie nord-est de la Mongolie intérieure. [**New Centre of Endemic Plague in Mongolia.**]—*Bull. Office Internat. d'Hyg. Publique.* 1931. Sept. Vol. 23. No. 9. pp. 1592–1604. With 1 map in text.

Since 1924 epidemics resembling plague have been reported from the north of Tungliao in the northeast of Inner Mongolia. These outbreaks were identified as plague by Japanese and Chinese doctors in 1927–28. Drs. Nishimura and Kodama were sent to Malizintsu and other villages to make an enquiry. The authors describe the area in which plague is found and give a map of the country. They discuss the character of the epidemics and the possible origin of plague in this region. As regards rodents which have played an essential rôle in these epidemics the authors consider the susliks, *Citellus dauricus* and *Alactaga mongolica* the most dangerous. Rats are common enough, but not of so much importance.

J. H. Tull Walsh.

MOSTAJO (Benjamin), LONG (John D.) & ESKEY (C. R.). La campaña antipestosa en el Perú. [**The Antiplague Campaign in Peru.**]—*Crónica Méd.* Lima. 1931. May. Vol. 48. No. 815. pp. 155–160.

This is an account of the first 6 months of the campaign against plague in various Departments of Peru from October 1930. In Lima during the period in question there were 18 cases of human plague, the average for the preceding 5 years being 42·2. Rats were destroyed partly by poison (arsenic), partly by trapping. The cheopis index on *R. norvegicus* was 3·28 in October 1930, 0 in February 1931; on *R. alexandrinus* and *R. rattus*, 9·2 in October, 0·23 in February. In Callao the figures [species of rat not stated] were from November to February 17·65, 3·41, 8·26 and 5·15 respectively. There were no human cases during this period. In the Province of Pacasmayo (La Libertad) there were 27 human cases in the first 3 months, 8 in the second, and the flea index was 34·72 in December, 15·4 in January, 0·8 in February.

Special investigations were undertaken to determine whether a small rodent (pericote) was a carrier. In none of 3,248 subjected to autopsy was any positive evidence found, and inoculation with liver and spleen emulsions from 83 also proved uniformly negative.

The staff for examining the rats and for taking smears and for sending fleas to the central laboratory were trained at the laboratory.

H. H. S.

LONG (John D.). **Cooperative Campaign for the Eradication of Plague in Peru. Final Report.**—*Public Health Rep.* 1931. Sept. 11. Vol. 46. No. 37. pp. 2161–2168.

In June 1929 the Pan-American Sanitary Bureau authorized co-operative epidemiological studies of plague in such South American countries as had plague in their territories. Peru accepted the proposed co-operation in September 1930 and the Government gave all possible assistance to those who carried out the campaign. The country was divided into sectors, generally coinciding with the boundaries of the Departments. To each Department there was sent a sanitary assistant, charged with the duty of spreading poison in all places where cases of plague had occurred during the preceding five years. To the chief seaports of the Republic there were sent assistant epidemiologists who were instructed to trap and examine rats and send smears from rats or guineapigs which had died after inoculation, with material obtained from rats. These assistants also sent fleas to the Lima laboratory for identification and computation of prevalence. Rat poisoning was also carried out in the ports and neighbouring towns. The cases of plague in the whole Republic during 1930 were: January, 56; February, 29; March, 16; April, 36; May, 26; June, 26; July, 11; August, 22; September, 13; October, 28; November, 37; December, 78. For 1931 the figures (up to July 20th) were: January, 33; February, 28; March, 9; April, 16; May, 2; June, 9; July, 1. The rats of Peru are *R. norvegicus*, *R. rattus* and *R. alexandrienus*. They may all be carriers of plague and harbour *X. cheopis*. All the seaports of the country were free from bubonic plague when this paper was written. The last case in any

seaport was recorded in April 1931 and the last infected rat in March 1931. Epidemiological data are given for the Departments and for the seaports. The campaign—September 1930 to June 30th 1931—was conducted in the most economical manner and there was a small balance left for purchase of arsenic and new traps to replace those which became useless during the campaign.

J. H. T. W.

COLOMBANI. La vaccination antipesteuse au Maroc en 1929–1930. [**Anti-Plague Vaccination in Morocco.**]—*Bull. Office Internat. d'Hyg. Publique.* 1931. Sept. Vol. 23. No. 9. pp. 1619–1623.

During the epidemic in Sous, 1929, the author studied the effects of anti-plague vaccination. The total number of vaccinations performed was 96,050. Three vaccines—vaccine from the Pasteur Institute, lipo-vaccine, and P.S.T. vaccine prepared from the pseudo-tuberculosis bacillus of rats—were employed and the author states that they gave practically the same results. Even if the vaccination does not confer certain protection on each individual it produces immunity for the majority. The immunity is not constant and not of long duration. [See also this *Bulletin* Vol. 28, p. 381 ; p. 874 (DANY).]

J. H. T. W.

GIRARD (G.) & HÉRIVAUX (A.). Recherche des porteurs sains de bacilles pesteux dans la région de Tananarive. [**Search for Healthy Carriers of Plague in Madagascar.**]—*Bull. Soc. Path. Exot.* 1931. Oct. 14. Vol. 24. No. 8. pp. 748–751. [Pasteur Inst., Antananarivo.]

These researches were made in the Civil prison at Antananarivo and in connexion with the plague hospital. In the prison a case of plague occurred in July 1930. All the prisoners were examined, but no carriers were found. Among 124 "contacts" examined by the authors no healthy carriers were found in relation to cases in the hospital. [This *Bulletin*, Vol. 28, p. 393 (LEGER).]

J. H. T. W.

GUILLINY (R.). La peste pulmonaire en Emyrne (Madagascar). Essai de traitement par le bactériophage. [**Pneumonic Plague in Madagascar treated with Bacteriophage.**]—*Marseille-Méd.* 1931. Nov. 25. Vol. 68. No. 33. pp. 641–653. With 6 text figs.

This paper refers to a small epidemic which occurred in 1926. There were 22 cases with 21 deaths and 1 recovery. Of these pneumonic cases, 5 were treated with d'Hérelle's pestiphage : 3 by intravenous injections and 2 by direct injection into the lungs and 3 others were treated by injections of bacteriophage from the Pasteur Institute into the lungs. A case of septicaemic plague was also treated with intra-venous injections of the bacteriophage. Not one of these nine cases received any benefit from the treatment.

J. H. T. W.

OTTEN (L.). Het probleem van de "seasonal prevalence" der pest. [**The Problem of Seasonal Prevalence in Plague.**]—*Geneesk. Tijdschr. v. Nederl. Indië.* 1932. Jan. 1. Vol. 72. No. 1. pp. 28–37. With 3 graphs in text. [4 refs.]

In accordance with the British Indian Plague Commission the author showed that the periodicity in the prevalence of plague in Java (at least in the mountainous parts) runs parallel with the ratflea index. The epidemic prevalence of plague in Java shows a rise in the third quarter of the year (the driest season) and reaches its summit about the end of the year. Thereafter—but still in the middle of the rainy season—there is a lowering of the curve which reaches its lowest point in the second quarter of the year.

The flea index follows at some distance the curve of low relative humidity of the atmosphere, an observation more or less contrary to experience in India.

W. J. Bais.

ARNAUD (J.) & RAYBAUD (A.). La prophylaxie anti-pesteuse à Marseille. [**Prophylaxis of Plague in Marseilles.**]—*Marseille-Méd.* 1931. June 25. Vol. 68. No. 18. pp. 789–808. With 3 text figs. [5 refs.]

This is a combined report from the Director of Municipal Hygiene and the Chief of the Laboratory of Maritime Sanitary Service. It contains a full and detailed account of the laws under which plague is made a notifiable disease and describes the duties of medical men under these laws. The chief measure of prophylaxis consists of isolating and vaccinating all "contacts" exposed to the same contagion as the plague patient and this is often found very difficult owing to opposition from the people themselves. The necessity for destruction of rats and proper construction of buildings is discussed. Stress is laid on the value of information and instruction given to the general population concerning infectious disease and value of Hygiene since, as the authors remark: "The French, especially in the South, do not like to obey without understanding."

J. H. T. W.

RAYBAUD (A.). A propos de quelques cas de peste survenus à Marseille. [**Plague in Marseilles.**]—*Marseille-Méd.* 1931. May 25. Vol. 68. No. 15. pp. 669–694. With 9 charts in text. [1 ref.]

—— & GUGLIELMI (F.). Quelques propos sur l'épidémiologie de la peste. [**Epidemiology of Plague.**]—*Ibid.* Sept. 25. No. 27. pp. 357–368. With 1 text fig. [Refs. in footnotes.]

The author states that, from the beginning of the twentieth century, hardly a year has passed without a few cases of plague in Marseilles. Most frequently the cases are found on ships arriving in the port and these are isolated at once. Sometimes sporadic cases or small epidemics occur in the town, generally in the area near the port. Fifteen cases are described in detail as occurring in 1930. Eleven recovered and four died. Of the latter one case had marked pneumonic disease; in the sputum of that patient the plague bacillus was found together with the pneumo-bacilli of Frankel and Friedlander. Treatment with anti-plague serum gave good results.

J. H. T. W.

i. GRAHAM (J. D.). Recherches sur les puces des rats dans la Présidence de Madras. [**Fleas and Rats in the Madras Presidency.**] —*Bull. Office Internat. d'Hyg. Publique.* 1931. Sept. Vol. 23. No. 9. pp. 1613–1615. [7 refs.]

ii. ——. Résultats obtenus avec le sérum antipesteux de l'Institut Haffkine. [**Results with Anti-Plague Serum.**]—*Ibid.* pp. 1616–1618.

i. Contains nothing that has not previously been published, see this *Bulletin*, years 1920–1929 Index (GOYLE, HIRST, CRAGG).

ii. Gives a table of results obtained by Col. F. P. MACKIE and Dr. B. P. B. NAIDU, in the Lingampalli Plague Hospital, Hyderabad (Deccan).

Total admissions to the Lingampalli Plague Hospital, Hyderabad (Deccan) from 11 February to 4 March 1931 = 76 cases.

Category	Diagnosis by culture		Treated by the serum		Controls	
	Bubo	Blood	Cases	Deaths	Cases	Deaths
A Grave septicaemia with or without buboes.	+	+++	10	7	8	8
	—	+++	1	1	3	3
	+	++	3	2	4	4
	—	++	1	1	2	2
			15	11 (73·3%)	17	17 (100%)
B Early or light septicaemia or bubonic only	+	+	7	1	3	2
	—	+	1	0	1	1
	+	—	11	3	4	1
			19	4 (21%)	8	4 (50%)
C	Clinical plague bacteriologically negative		9	0 (0%)	8	2 (25%)
Total of all cases			43	15 (35%)	33	23 (70%)

+ = less than 10 colonies in 0·25 cm^3 of blood.
++ = less than 100 colonies in 0·25 cm^3 of blood
+++ = 100 colonies and more in 0·25 cm^3 of blood.

[See also this *Bulletin*, Vol. 28, p. 381 (GRAHAM)].

J. H. T. W.

NAIDU (B. P. B.) & MACKIE (F. P.). **The Serum Therapy of Plague.**—*Lancet.* 1931. Oct. 24. pp. 893–897. [Haffkine Inst., Bombay.]

A very interesting communication is here presented of the transference of precise, controlled laboratory experiments to practical application in man. Even the human trials have something of the precision of a laboratory experiment and are as well controlled statistically as is usually possible. The authors select rabbits, sheep, or cattle to furnish the curative sera in place of the horse because these animals are naturally susceptible to pasteurella infection. They

advocate and use as antigen a highly virulent strain of *Past. pestis* and prefer the intravenous route for administration because subcutaneous injection gives too severe local and general reactions. Only one calf survived out of the two experimental animals used and it received 38 intravenous injections in 12 months, beginning with one-fifth of an agar slope and ending with 100 slopes at a dose. Tables II, III, IV, V and VI give the results of administration of serum in the rabbit after infection, the comparison of immune sheep and calf serum with other plague sera, and the statistical results of use in human beings. Table II sets out that serum was administered in rabbits after infection, immediately, 24, 48, 72 and 96 hours after, in 34, 40, 43, 48 and 25 rabbits with mortalities of 0, 0, 9·3, 31·2, 32 per cent. respectively. Untreated control animals, 33 in number, gave a mortality of 94 per cent. The human trials, at first of every alternate case and then of every third case, gave when class C, consisting of cases not bacteriologically confirmed is excluded, 15 deaths out of 34 cases as compared with 21 deaths out of 25 in the control series. These are striking figures and "the results when applied to a small human epidemic were very promising."

W. F. Harvey.

SCHUT (J.). Behandeling van pestlijders met Omnadin. [**Plague Treatment with Omnadin.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1931. Sept. 15. Vol. 71. No. 12. pp. 1059–1069. With 7 charts in text.

Referring to previous papers on this subject (see this *Bulletin,* Vol. 27, p. 734) the author now quotes further experience. In the Tengger mountains (East Java) outbreaks of plague show a remarkable inclination to pulmonary manifestations. Bubonic plague is rare, plague pneumonia, either primary or secondary after septicaemic plague, is the common form. In view thereof the author emphasizes the necessity of immediate isolation of every contact in cases of suspected plague in his district. Any delay or waiting for the confirmation of the diagnosis leads to further spread of the disease.

Convinced of the beneficial influence of Omnadin injections, Schut treated all the isolated contacts prophylactically with this drug; since which among this group were seen no cases of primary plague pneumonia, only cases of bubonic plague and septicaemic plague, which means a certain advantage in view of the prognosis.

Out of 7 seriously ill contacts two patients died from plague with secondary pneumonia. Five recovered, four of whom had no doubt suffered from plague.

Omnadin injections are harmless, even if given in large doses (e.g. 8 cc. in 24 hours, or 2 cc. 37 times within 2 weeks) and painless. Administered with therapeutic purpose their action must be supported by cardiotonics. In patients who died notwithstanding the Omnadin treatment, post mortem no plague bacilli could be detected, contrary to experience in previous cases.

[The latter advantage appears rather problematic. The curious substitution of bubonic and septicaemic for primary lung plague (which would imply another mode of infection) under influence of prophylactically administered Omnadin is a feature for which no explanation is offered.]

W. J. Bais.

LENSKAJA (G. N.), EGOROW (A.), SIWOLOBOW (W.), LARIONOWA (S.), MARJINA (J.), LEBEDEWA (E.), BARSUKOWA (O.) & DIKOW (A.). Lebenserhaltung des *B. pestis* bei vieljähriger Aufbewahrung auf Nährböden. [**Duration of Life of** *B. pestis* **on Media.**]—*Rev. Microbiol., Epidémiol. et Parasit.* 1931. Vol. 10. No. 2. pp. 149–156. [11 refs.] [In Russian. German summary pp. 156–158.]

Of 302 cultures some were found to be still living from 1¾ to 6½ years after their original sowing, although no subcultures had been made.

W. F. Harvey.

GIRARD. Les diverses formes de peste à Madagascar. [**Different Forms of Plague in Madagascar.**]—*Bull. Office Internat. d'Hyg. Publique.* 1931. Sept. Vol. 23. No. 9. pp. 1605–1610. With 3 diagrams. [1 ref.]

This is a compilation consisting mainly of graphs and charts for the years 1926 to 1930. It contains nothing new.

J. H. T. W.

BESSONOWA (A.). Noch ein Fall von Pigmentbildung beim Peststäbchen. [**Another Case of Pigment Formation by Plague Bacilli.**]—*Rev. Microbiol., Epidémiol. et Parasit.* 1931. Vol. 10. No. 2. pp. 159–164. With 2 text figs. [2 refs.] [In Russian. German summary pp. 164–165.]

A stab agar culture which had been kept for 2½ years without subculture developed a golden yellow pigment. Subcultures of the original, of 10 to 15 days' growth, also exhibited pigment, but of another colour, rose, brown and white, Smears made from pigmented cultures showed a considerable number of spherical plague bacilli.

W. F. Harvey.

APPEL. Epidémie de peste pulmonaire de Condé-Smendou (janvier 1931).—*Rev. d'Hyg. et de Méd Préventive.* 1932. Jan. Vol. 54. No. 1. pp. 5–40. with 8 text figs.

COUVY. La peste à l'Hôpital Central Indigène de Dakar, en 1929. Extrait du rapport annuel.—*Ann. de Méd. et de Pharm. Colon.* 1931. Apr.–May–June. Vol. 29. No. 2. pp. 318–328. With 1 chart in text.

FONQUERNIE. Quelques considérations sur la peste à Tananarive. (Epidémiologie, clinique, traitement.)—*Ann. de Méd. et de Pharm. Colon.* 1931. Apr.–May–June. Vol. 29. No. 2. pp. 246–286.

FONQUERNIE. Note sur l'épidémiologie de la peste à Tananarive (peste humaine et peste murine).—*Bull. Soc. Path. Exot.* 1931. Nov. 12. Vol. 24. No. 9. pp. 863–865. [Bureau of Hygiene, Antananarivo.]

FONQUERNIE (J.). Considérations sur un cas de longue incubation de peste pulmonaire.—*Bull. Soc. Path. Exot.* 1931. Dec. 9. Vol. 24. No. 10. pp. 904–906. [Municipal Bureau of Hygiene, Antananarivo.]

FULCONIS. La peste au Sénégal en 1929. Extrait du rapport annuel.—*Ann. de Méd. et de Pharm. Colon.* 1931. Apr.–May–June. Vol. 29. No. 2. pp. 286–311. With 1 chart.

GIRARD (G.). Au sujet de la peste murine en Emyrne.—*Bull. Soc. Path. Exot.* 1931. Nov. 12. Vol. 24. No. 9. pp. 865–867. [Pasteur Inst., Antananarivo.]

MARQUE. La peste dans la circonscription de Dakar et dépendances, en 1929. Extrait du rapport annuel.—*Ann. de Méd. et de Pharm. Colon.* 1931. Apr.–May–June. Vol. 29. No. 2. pp. 311–317.

CHOLERA.

LEAGUE OF NATIONS MONTHLY EPIDEMIOLOGICAL REPORT. 1931. July 15. Vol. 10. No. 7. pp. 263–271. With 3 maps in text.—**Cholera in 1930–31.** [In parallel French & English.]

Cholera incidence declined markedly during 1930 in the greater part of the world, and this decline was maintained in the early months of 1931. British India remained the most important focus, the disease far from decreasing, taking a larger toll than during preceding years. Short and localized epidemics, which were promptly suppressed, occurred in Afghanistan and Persia. In the Philippines, after several years of absence, cholera made its appearance again in March 1930 and was still persisting in July 1931. Tables are given showing the distribution of the disease, number of cases and deaths throughout the area from which information is gathered.

J. H. Tull Walsh.

NORMET (Léon). Le choléra en Annam. [**Cholera in Annam.**]—*Bull. Soc. Méd.-Chirurg. Indochine.* 1931. June. Vol. 9. No. 6. pp. 449–454.

For the past five years cholera has been the only serious epidemic disease in Annam. The usual measures for protection stayed the progress of the disease but did not abolish it. In 1927 anticholera vaccination on a large scale was adopted and 3,669,961 vaccinations were carried out. The value of this vaccination is incontestable. In the month of August 1927, there were 619 cases and 447 deaths. In September the vaccinations were completed and in October the number of cases fell to 9 with 5 deaths. Vaccine in one injection of 2·0 cc. [strength not stated] was efficacious and convenient. It is difficult to carry out vaccination in two doses except in schools or among troops and civil servants. It was found that vaccination of "carriers" sometimes caused a severe attack of cholera. This danger can be avoided if each individual is given 5·0 gm. of lactic acid in 250·0 gm. of water a few minutes before the inoculation. Cholera has practically disappeared—so far as statistics are available—since 1927. Lactic acid is not only valuable as a preventive, but of great importance in treatment of cholera. Injections of saline solution and Kaolin were most useful.

J. H. T. W.

i. CORPUS (Teofilo). **The Problem of the Control of Cholera Carriers.**—*Jl. Philippine Islands Med. Assoc.* 1931. Dec. Vol. 11. No. 12. pp. 469–473. [6 refs.]

ii. ——. **The Cholera Campaign and the Experience gained therefrom.**—*Ibid.* pp. 477–481. [Meisic Health Station, Manila.]

i. The control of cholera carriers is still an indefinite and difficult problem for health workers. At present only a certain class of people, principally food handlers, can be examined. There should be regulations obliging the entire population to submit stool specimens to enable the officials to determine the presence of carriers and there should be laws requiring the parole of cholera carriers for a period of four years.

ii. In the City of Manila division of work and notification of cases made possible the rapid suppression of the disease. Increase in and

mortality from gastroenteritis may be an indication of the possible appearance of cholera. Vaccination proved effective. The taking of stool specimens, disinfection and cleaning of premises all helped to control the disease. Inspection of cadavers and taking of swabs make possible the detection of cholera.

J. H. T. W.

SIAN (Jose). **Report of Trip to the Province of Occidental Negros.**—*Monthly Bull. Philippine Health Serv.* 1931. Mar. Vol. 11. No. 3. pp. 132–139.

This is an official report to the Director of Health, Manila, on cases of cholera in the province of Negros and on the sanitary conditions at the end of 1930. The number of patients seen was 51. Of these 23 had been vaccinated against cholera. A large number of carriers was found. The sanitary conditions were generally bad and even 3 out of 10 artesian wells rendered positive results for cholera vibrios.

J. H. T. W.

HERNANDO (Eugenio). **The Control of Cholera in the City of Manila throughout the Different Epochs.**—*Monthly Bull. Philippine Health Serv.* 1931. Feb. Vol. 11. No. 2. pp. 49–81. With 4 diagrams. [29 refs.]

The first scientific recommendations of measures of prophylaxis against cholera in Manila date from 1820, when CASAS advocated cleansing of the city and sewerage, but no action seems to have followed. Some sewerage was provided in 1852 and by 1882 a water supply, described as giving water of poor quality, was completed. After the epidemic of 1888 a maritime quarantine and a military or sanitary cordon were introduced. There was another epidemic in 1894. The first epidemic of cholera after the sovereignty passed to America was in 1902. Active sanitary measures were taken. The water supply was protected, insanitary properties were destroyed and the sale of fruits and vegetables was prohibited. The epidemic, however, to quote the author, "following its natural course, continued till the year 1904 ending by consumption, that is, because no more susceptible persons were available to its voracity." A table shows that since 1903 there have been three occasions when the number of cases exceeded a thousand, viz. in 1906, 1908 and 1916. In the decennium 1921–30, although in all but 2 years cases are recorded, only once (1925) did the number exceed 100.

The author next gives an account of the sanitary organization of the city at the present time. A new water supply begun in 1925 was completed in 1931. The water is chlorine-treated; the reservoir annex has a capacity of 9,000,000,000 gallons (the present population of the city is 332,778). Although a fair proportion of the houses are on the sewerage system it is estimated that over eighty thousand persons still dispose of their dejecta to the possible danger of the public health. In 1923 anticholera inoculation was made compulsory. Since 1920, when inoculation was first used extensively, the numbers of persons receiving it have increased from 15,623 in 1920 to 265,676 in 1929.

The author seems to think that the money this cost might have been better spent on sanitary improvements.

The author next divides the data into three sets. (1) The first period, 1905–14, characterized by active sanitary improvements; (2) The second period, 1915–19, when nothing was done; (3) The third period, 1920–29, when the only improvement was the introduction of anti-cholera inoculation.

In each period he fits a straight line to the annual cases and another straight line to the annual deaths. In the first and third period these lines slope downwards and in the second period upwards. The author thinks that these are proofs that the sanitary improvements of the first period and the introduction of inoculation in the third period were responsible for the trends. The author has also calculated the correlation between the proportion of the population immunized and the attack rate from cholera, allowing a lag of one year, i.e. the variables are proportion immunized in year n, proportion attacked by cholera in year $n+1$. The co-efficient is—$0{\cdot}57 \pm 0{\cdot}15$. He concludes that these calculations confirm the "efficacy of the anti-cholera inoculation as an efficient sanitary measure."

He has, however, noted earlier in the report that "vaccination against cholera may be used as an emergency measure for the control of an already existing epidemic of said disease, but could not be used easily as a permanent and routine sanitary measure."

[Were the series of years available sufficiently long—which they were not—for analysis on these lines, it would be necessary to adopt somewhat more refined methods. Since, on the whole, cholera has decreased while, on the whole, the number of immunized persons has increased with time these variables must be negatively correlated; but that does not go very far towards establishing a causal relation. The usual method would be to correlate deviations from the respective secular trends. But the trends are very irregular. That the straight lines are wholly inadequate representations of the trends in the sub-periods appears from the fact that, for instance, in the 2nd period more than 88 per cent. of all the cases occurred in 2 out of the five years, and in the 1st period over half the total occurred in 2 out of the 10 years. In other words the author's statistical calculations do not materially strengthen any inferences which a reader may be disposed to draw from the evidence as a whole.]

M. Greenwood.

KIRIBAYASHI (Shigeru). i. **Notes about the Early Diagnosis of Cholera. Part I. Especially on the Agglutination Test when Pepton-Water is used as the Medium.**—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*).—1931. Oct. Vol. 30. No. 10 (319). [In Japanese. English summary pp. 80–82.]

——. ii. **Supplementary Notes about the Early Diagnosis of Cholera. Part II. Especially on the Bacteriolysis Test when Peptone-Water is used as the Medium.**—*Ibid.* Dec. No. 12 (321). [In Japanese. English summary pp. 103–105.]

i. In this test a series of 10 tubes is set up, each containing 2 cc. of 1 per cent. peptone water. A dilution of a cholera agglutinating serum is made at 1 in 25 with the same 1 per cent. peptone water, and 2 cc. of the serum-dilution is added to No. 1 of the series of tubes. Successive transferences of 2 cc. of mixtures made in each of the tubes, except the last, which remains as a control, give dilutions of cholera serum in peptone water ranging from

1/50 to 1/12,800. A suspicious colony from a plate culture spread with test faeces is suspended in 1 cc. peptone water and one drop added to each of the 10 serial tubes. The tubes are then incubated for 3 hours and readings taken of the resultant agglutination. The test is claimed to be not only rapid, but more sensitive than ordinary methods of test.

ii. The test is an *in vitro* one of specific bacteriolysis. A loopful of a 20-hour agar culture of test vibrio is suspended in peptone water (peptone 3 ; sod. chloride 5 ; dist. water 1,000) of pH 7·6 which is isotonic with the serum components of the test. A comparison is made by setting up two sets of dilution mixtures, the one containing inactivated immune serum, complement and suspension of test organism and the other, a control, containing inactivated rabbit serum, complement and suspension. Specific bacteriolysis is indicated already after 3–5 hours by the absence of turbidity in the first set of mixtures and positive turbidity in the control set.

W. F. Harvey.

SHOUSHA (A. T.). **Group Agglutination Reaction in Cholera. (A Contribution to the Identification of** *V. cholerae.*)—*Jl. Egyptian Med. Assoc.* 1931. Sept. Vol. 14. No. 9. pp. 438–453. [16 refs.]

Two vibrios, Nos. 20 & 67, were isolated at El Tor from the faeces of pilgrims, one from a case of dysentery and the other from a normal individual. No. 20 has been carefully examined by the author in strict comparison with a true cholera vibrio, the Kolle strain. It is largely a question here of the establishment of group agglutination of non-cholera vibrios by a cholera serum. Vibrio " Kolle " was agglutinated both by the testing serum of the Public Health Laboratory, Cairo, and that of the El Tor quarantine station. Vibrio No. 20, however, was not agglutinated by the Public Health serum, but was agglutinated by the El Tor serum. It was found in the investigation that the agglutinative receptors of the El Tor vibrios 20 and 67 with the Quarantine serum were the group labile or flagellar receptors (H) and that the specific, somatic (O) receptors of these two vibrios were quite different from the somatic receptor of the true cholera vibrio. It is very desirable therefore that testing sera should be standardized by immunizing animals with heated suspensions, by the use of a definite species of animal for their production and that they should be accompanied by the culture used for immunization as control.

W. F. Harvey.

QUENARDEL. Vaccination anticholérique. Echec de la méthode à Siemréap. [**Failure of Anti-Cholera Vaccination.**]—*Bull. Soc. Méd.-Chirurg. Indochine.* 1931. Oct. Vol. 9. No. 9. pp. 718–721.

The author reports an outbreak of cholera which lasted from the middle of June to the end of July 1931. There were 36 cases with 29 deaths—of these 7 were prisoners in the Siemreap Jail, Cambodia. All these cases had been inoculated with anti-cholera vaccine, 4 of them with two doses of 1·0 cc. and 2·0 cc. with an interval of eight days and 3 with only one injection when attacked with cholera before the second could be given. In the discussion which followed, Dr. SONCHARD pointed out that these cases did not warrant pessimistic conclusions concerning the value of anti-cholera vaccine. No known vaccine of any kind gave

absolute protection to everybody and the value of vaccination can only be judged by comparing large numbers. He gave instances where statistics showed the value of vaccination.

J. H. T. W.

MAITRA (G. C.) & AHUJA (M. L.). **Note on the Probable Causes of Unpleasant Reactions following Prophylactic Cholera Inoculation, with Special Reference to Certain Avoidable Factors.**—*Indian Jl. Med. Res.* 1931. July Vol. 19. No. 1. pp. 159–162. With 3 figs. on 1 plate. [2 refs.] [Central Research Inst., Kasauli.]

Many thousand doses of cholera and prophylactic T.A.B. vaccines are sent out from Kasauli every year. Although the bulk of the supply is for the army a considerable quantity of these vaccines is used by the civil population of British India and the Indian States. In spite of the stringent precautions taken during manufacture and storage, it is not unusual to get occasional complaints that particular capsules of vaccine produced severe and general reactions after injection. Such complaints most often refer to the cholera vaccine, particularly from civil practitioners who generally use a single dose of 1·0 cc. for individual instead of an initial dose of 0·5 cc. followed by 1·0 cc. after ten days' interval. Want of asepsis, blunt needles, etc., might cause trouble, but such points cannot be checked at the source of manufacture. The following possibilities were investigated: (1) Impure and contaminated vaccine. All samples supposed to have caused unpleasant results were examined culturally and found free from contamination. They were also examined microscopically with appropriate staining and showed nothing but the organisms that had been used originally; (2) Excessive dosage due to errors in standardization. Cholera vaccines, eight times as strong in bacterial content as those used for preventive inoculation in man, have no severe local or general effect when injected subcutaneously into guineapigs; (3) Excess of carbolic acid used as preservative. A vaccine of standard strength with 1·0 cc. carbolic acid added injected into 3 human volunteers and 3 guineapigs produced no more reaction than the vaccine to which 0·5 cc. is added; (4) Excess of foreign proteins (other than bacterial protein) such as peptones, proteoses and other nutrient materials together with certain products of bacterial metabolism. A twenty-four hours' broth culture of vibrios is planted on rolled trypsinized casein agar. The bottles are incubated at 37° C. for 24 hours and the resulting growth is washed off with normal salt solution and decanted into sterile test-tubes 6 inches by 1 inch. These washings contain a certain amount of the nutrient material. The washings stand for 48 hours to allow the bacteria to be deposited and the supernatant fluid is then decanted off. If there should be any carelessness at this step an excess of protein may get into the vaccine. Vaccine with excess of supernatant fluid produced in 3 volunteers severe local reactions and fever. They could not return to duty for 2 days. In another 3 moderate reactions only. This same vaccine produced, when injected into 2 guineapigs, redness, oedema and local necrosis after 24 hours. Cholera vaccine prepared from the bacterial deposit and containing the minimum possible amount of nutrient material would reduce to a very considerable degree untoward reactions following prophylactic inoculations.

J. H. T. W.

MAITRA (G. C.) & AHUJA (M. L.). **A Comparative Study of the Efficiency of Cholera Vaccine stored in a 'Frigidaire' at 4° C. and in a Biological Incubator at 37° C.**—*Indian Jl. Med. Res.* 1932. Jan. Vol. 19. No. 3. pp. 957–962. With 1 graph in text. [Central Research Inst., Kasauli.]

The authors state that owing to the difficulty associated with the production of cholera in experimental animals and the debatable part played by complement deviating bodies, haemolysins, opsonins, etc., as defensive factors in a serum, they have used agglutinogenic response as the index of antigenic findings.

The agglutinogenic power does not apparently diminish with storage at 37° C.

W. F. Harvey.

YOSHIZUMI (Tai). **Supplement to the Knowledge of the Bacteriophage Active for Cholera Vibrio.**—*Japanese Jl. Experim. Med.* 1931. Aug. 20. Vol. 9. No. 4. pp. 353–358. [11 refs.] [Govt. Inst. for Infectious Diseases, Tokyo.]

The classification of cholera vibrios in terms of bacteriophage action adopted by the author is that of NOBECHI and is :—(1) non-lysogenic susceptible ; (2) non-lysogenic resistant ; and (3) lysogenic resistant strains. Out of 42 strains of vibrio which were placed under test, four were found to be lysogenic, that is to say capable on cultivation of producing the lytic agent. These four strains were in every way typical cholera vibrios and were themselves resistant to the lytic agent whatever might be its derivation. It may be laid down that the lytic agent derived from a lysogenic strain of cholera will act on certain cholera vibrios but not on all. Of the remaining strains of cholera vibrio 12 were non-lysogenic resistant and 26 non-lysogenic susceptible.

W. F. Harvey.

MAITRA (G. C.) & MALLICK (S. M. K.). **Experimental Observations on Cholera 'Phage Lysate as a Component of Prophylactic Cholera Vaccine.**—*Indian Jl. Med. Res.* 1931. Oct. Vol. 19. No. 2. pp. 701–704. [5 refs.] [Central Research Inst., Kasauli.]

Vibrios which have been lysed by bacteriophage when injected subcutaneously in the rabbit produce neither any symptoms nor any immunity to subsequent test by intravenous injection of 1½ times the minimal lethal dose of killed cholera organisms. It was also found that the addition of cholera 'phage lysate to cholera vaccine did not add anything to the antigenic power of the latter.

W. F. Harvey.

PASRICHA (C. L.), DE MONTE (A. J.) & GUPTA (S. K.). **Mutation of Cholera-like Vibrios under the Action of Bacteriophage. (Lysability of Cholera-like Vibrios by Pure-Line Races of Cholera Bacteriophage and Changes induced in the Serological Reactions of Cholera-like Vibrios under the Influence of Bacteriophage.)**—*Indian Med. Gaz.* 1931. Nov. Vol. 66. No. 11. pp. 610–618. [23 refs.] [School of Trop. Med & Hyg., Calcutta.]

Comparisons between cholera and cholera-like vibrios and attempts to identify them or to change the one into the other have been made by

many workers ever since the cholera vibrio was discovered. This subject has now been approached by the authors from the point of view of apparent transformations effected in the course of lysis by bacteriophage. Their work may be summarized as follows :—

The pure-line cholera 'phages type A, B and C, were used in test and it was found that none of the 355 strains of non-agglutinating cholera-like vibrios was lysed by type A. This type is capable only of lysing smooth forms of the cholera vibrio. Types B and C on the other hand, either singly or together, caused lysis of 73 of the strains. Some of the non-lysable strains became lysable by culture on an increasingly alkaline medium. Agglutinability was also found to be a characteristic of some of the secondary resistant colonies which developed after 'phage action. These were not only agglutinable but were capable of absorbing agglutinin completely from a cholera type-serum. The agglutinability was difficult to maintain on subculture. Finally they conclude that there is some bacteriophage and serological relationship between the true cholera vibrio and the cholera-like forms. Many of these latter they think to be mutation forms of the true cholera vibrio and to play a great part in the etiology of the disease.

W. F. Harvey.

PANAYOTATOU (Angélique). Les phénomènes d'hématolyse et d'hémato-agglutination par les vibrions. [**Haemolysis and Haemagglutination by Cholera Vibrios.**]—*Bull. Soc. Path. Exot.* 1931. Dec. 9. Vol. 24. No. 10. pp. 907–909. [1 ref.]

——. Le phénomène d'agglutination des vibrions. Quelques expériences biologiques sur quatre souches de vibrions de l'épidémie de choléra à Basrah. [**Some Experiments on the Agglutination of Cholera Vibrios from a Basrah Epidemic.**]—*Ibid.* pp. 909–911. [Chatby Quarantine Lab., Alexandria.]

In the first paper there is described the phenomenon first of agglutination and then haemolysis of guineapig erythrocytes by cholera vibrios. In the second paper the author confirms the fact that vibrios, which are agglutinated by high dilutions of cholera serum on isolation, may in time lose their agglutinability.

W. F. Harvey.

KITASHIMA (Taichi) & WATANABE (Yoshimasa). **On the Types of** *Vibrio cholerae* **which invaded Japan.**—*Kitasato Arch. Experim. Med.* 1931. July. Vol. 8. No. 3. pp. 195–233.

In this article the authors review the types of cholera vibrio found in epidemics from the first identification of the organism two years after its discovery by Koch to those occurring in epidemics in Japan at the present day.

W. F. Harvey.

JOURNAL OF THE PUBLIC HEALTH ASSOCIATION OF JAPAN. 1931. Sept. Vol. 7. No. 9. pp. 4–5. Cholera on Board S.S. Cathay.

MORGAN (M. T.). L'épidémie de choléra en Irak dans l'été 1931.—*Bull. Office Internat. d'Hyg. Publique.* 1931. Dec. Vol. 23. No. 12. pp. 2165–2174. With 1 map in text.

YAWS AND SYPHILIS.

BUTLER (G. G.) in collaboration with SUMMERHAYES (G. M. L.). **Some Observations bearing on Yaws and Syphilis in Expectant Native Women attending the Maternity Hospital in Accra, Gold Coast.**—*West African Med. Jl.* Lagos. 1931. Oct. Vol. 5. No. 2. pp. 19–28.

The object of the investigation here reported was to attempt to estimate the prevalence of syphilis among expectant African mothers. The serum W.R. of expectant or recently delivered women at the Accra Maternity Hospital was tested together with W.R. of blood from the placental end of the cord and a histological examination of the placenta was carried out. The method used for W.R. was No. 4 of the Medical Research Council. The statistics refer to 450 women among whom the W.R. was positive in 32·5 per cent. Among those giving a history of yaws it was positive in 62·8 per cent. and negative in 79·7 per cent. of those denying yaws.

To 285 women in past pregnancies were born 838 living and 63 still-born children and there were 49 miscarriages and of the living 279 had died subsequently.

To 445 women in present pregnancy were born 404 living and 61 still-born children and 3 miscarriages. There were 27 deaths among the infants before leaving the hospital.

"From 445 women, with 1,393 pregnancies, 1,418 results have been recorded, the main features of which are 89 per cent. infants born alive and 8·8 per cent. still-births; and this is occurring in approximately a 30 per cent. Wassermann positive population, which is wholely untreated for all practical purposes. Among these 445 women, after excluding primipara and certain cases with incomplete histories, only 4·4 per cent. are regarded as presenting bad previous histories. When these are examined in detail there is about as much evidence against syphilis as in favour of it as the cause of the bad histories. When further search is made among the still-births it is found that about double the number of still-births arise among Wassermann positive as among Wassermann negative mothers but when the causation of these still-births is taken into account, there is apparently very little evidence to point to syphilis as being the incriminating factor though that hypothesis is suggested again by the high Wassermann rate in parallel with a low positive yaws rate revealed amongst the still-births arising from mothers with bad previous histories."

Further analysis of data "would seem to indicate that the Wassermann positive rate and yaws positive rate is approximately similar and at the normal level whatever the end result of the pregnancies may be except in a very small group labelled 'still-births without obvious cause.' There is an indication also that 'prematurity without obvious cause' is not influenced by the Wassermann and yaws positive rate of the mothers, but that it runs in relationship with the malaria positive rate. Nor does the progress of the infants appear to be influenced by the Wassermann positive or yaws positive condition of the mothers except in a very small group labelled 'died soon' where there is a deviation of these two factors from the normal levels and is suggestive of the presence of syphilis. There is not a very wide divergence in the progress of the infants born at full term and those 'premature without obvious cause,' which suggest that the malaria infestation of the mother in the premature group is not causing much if any harm to the infant, and this is confirmed by the satisfactory progress of these infants when compared with an equal sized consecutive group from non-malarial mothers."

"Owing to the infrequency with which obvious syphilis is seen in a

local African community, that is heavily gonorrhoea and yaws infected, a problem seems to be presented, for it would seem that syphilis should be as rampant as gonorrhoea. Owing to the presence of yaws the value of a serological test alone is almost useless.

"The explanation why syphilis should not be obvious everywhere seems inexplicable, but there remains the possibility of a cross immunity from yaws.

"The importance of knowing the position cannot be over-estimated, for syphilis can only be adequately controlled in its earliest manifestations. If, however, yaws is conveying a cross immunity it must definitely affect our procedure in yaws and antenatal campaigns if a positive Wassermann reaction is any indication of an immunity. The evidence available to indicate the presence of syphilis in the apparent absence of the ordinary direct manifestations would seem likely to be best observed in possible effects on pregnancy and the health of the new born, that is in ante-natal and post-natal mortality; and it is on the statistics from the Maternity Hospital balanced against certain laboratory examinations that the present line of study has been made. The method of approach has been to superimpose 'maps,' as it were, of the results of pregnancies, histories of previous pregnancies and the progress of the infants upon other 'maps' of the Wassermann reaction and yaws history, in order to see where there is deviation or overlapping in the various features that are suggestive of the action of syphilis.

"The results have been almost uniformly negative and indicate that there is probably in this study not more than about one case which recurs on these 'maps,' and is highly suggestive of syphilis. If the deductions are sound, what is the explanation, and can it mean a cross immunity? The Wassermann positive rate and the yaws history rate run at about a 30 per cent. level throughout most of statistics obtained for the results of pregnancies. The one group in which there is a deviation from this level is among certain still-births, but the group is a very small one, namely 2·7 per cent. for a wholly unprotected and untreated population, the measure of whose opportunity of acquiring syphilis must be high if judged by gonorrhoeal infections. This group of still-births is only about a fifth of the actual cases of still-births, and it may not be improbable that ecbolics and deliberate violence are important factors in their causation, so that it may be quite unfair to judge a previous history on the occurrence of a still-birth or two.

"The Wassermann reaction on cord bloods shows 5 per cent. as being positive, but there is every indication that it is a passive filtering over of Wassermann reacting substances from the maternal circulation, for they disappear very soon in the infant blood in those few cases in which a re-examination has been made.

"No indication whatever of syphilis has been obtained in the examination of placenta."

H. S. Stannus.

BUTLER (G. G.). **Some Observations bearing on Yaws and Syphilis.**—*Gold Coast Rep. of Laboratory Services Year 1929–1930.* Appendix D. pp. 34–37.

Dr. Butler draws attention to the low records of primary sore and congenital syphilis (a common observation among native races) and believes this must mean that the disease (syphilis) is either rare or unreported. An attempt was made in association with Dr. SUMMERHAYES working at the maternity hospital to arrive at some idea of the incidence of syphilis and yaws in pregnant women and their infants. The numbers were small and Dr. Butler states in his conclusion—"If I may make any deductions from these very incomplete lines of enquiry they are that about 30 per cent. of the maternity hospital

cases examined show positive W.R. but that only about one tenth of this is likely to be caused by syphilis " . . . and that " the W.R. in infants at birth in a yaws infected country is not as useful a procedure as the same test at a later date."

H. S. S.

WILKINSON (W.). **Syphilis and Yaws in South Kavirondo.**—*Kenya & East African Med. Jl.* 1931. Sept. Vol. 8. No. 6. pp. 164–171.

Some rather discursive observations upon these two diseases in Kenya from which the following points have been gleaned. The author believes syphilis " to be one of the main contributory factors in the appallingly high infant and child death rate." Congenital syphilis is however, uncommonly seen and no case presenting Hutchinson's teeth was observed, the reason being it is suggested " that affected children die either at birth or shortly afterwards." " It is quite common for a woman to say that her baby was born all right but that a few days afterwards its liver swelled up and it died. This may be due to syphilis " [but it sounds rather unlikely].

Primary chancres are seldom seen and in those recorded the author was unable to demonstrate spirochaetes by the Indian ink method. He found difficulty in many cases in knowing whether he had to deal " with multiple chancres or the secondary rash, or some other disease." Secondary lesions appear often to be limited to condylomata. Tertiary lesions are difficult to diagnose from lesions due to yaws. It is noted that bismuth injections have become so popular that many natives seek treatment with no suggestion that they have had syphilis !

Yaws is said to have existed (in the Luo country) for 20 years only. These people give a high percentage of positive W.R. and yaws is gradually dying out. No yaws was seen among the Watende, a tribe which " bedaubs itself with red clay." Among the Kisii, however, the disease is spreading. The mother-yaw is commonly sited on the perineum and genitalia, thought by the natives to be due to sitting upon infected spots. A yaw on the sole of the foot has not been seen. A few cases of gangosa are recorded but none of J.A.N. Periosteal nodes are common but sabre tibiae rare.

H. S. S.

FITZGERALD (G. H.) & DEY (Nepal Chandra). **The Manifestations of Chronic Yaws.**—*Indian Med. Gaz.* 1931. Aug. Vol. 66. No. 8. pp. 425–430. With 5 text figs. [7 refs.]

The authors think the manifestations of yaws to which their article is devoted receive but scanty reference in text-books and believe a description of these conditions will help others to recognize the disease. Descriptions, with some good photographs, are then given of secondary eruptions on the soles and hyperkeratosis, both classed as " clavus (crab yaws)," ringworm yaws described as a squamous framboeside indistinguishable from tinea circinata, leucoderma and keloid. Juxta-articular nodules occurred in 3·5 per cent. of their 400 cases, but goundou in only 0·75 per cent. and a single case of gangosa only was seen. Bony lesions and tertiary ulcerations were found in 8 per cent. of patients.

H. S. S.

CONNELL (W. K.). **The Origin and Development of Bismuth Therapy in Yaws.**—*Kenya & East African Med. Jl.* 1932. Jan. Vol. 8. No. 10. pp. 270–279.

The subject matter of this paper is already known to readers of the *Bulletin* save perhaps the results of an investigation carried out by Dr. J. W. GRAHAM at the instance of the Colonial Medical Research Committee in an attempt to test under scientific control the relative efficiency of five different bismuth preparations in the treatment of yaws.

Although certain conclusions were suggested, it is obvious that, from what Dr. Connell says, Dr. GRAHAM was not given the facilities for carrying out the investigation in a proper way and the results can only be looked upon as before as opinions and then only as opinions in regard to the clearing up of the lesions present at the time, what has been called "clinical cure" or better described by the French as "blanchissement."

H. S. S.

SCHÖBL (Otto). **Further Experiments concerning Immunity in Treponematous Infections.**—*Philippine Jl. Sci.* 1931. June. Vol. 45. No. 2. pp. 221–231. With 1 text fig. [8 refs.]

The further animal experiments detailed in this article confirm previous findings. Intramuscular or intratesticular inoculation of monkeys with syphilis without formation of apparent lesions, initial or generalized, immunizes against cutaneous inoculation with yaws. Immunity develops in about the same time as it does when intradermal inoculation with syphilis is performed and an initial lesion is seen. Intra-meso-dermal inoculation with yaws, without production of skin lesion, confers immunity to yaws earlier than does intradermal inoculation with lesion formation. Dead yaws and syphilis antigen confers a high degree of antitreponematous immunity.

Intra-meso-dermal inoculation of treponema antigen performed on early cured yaws monkeys hastens the development of antitreponematous immunity. It prevents subsequent reinfection and development of late stages.

While intradermal superinfection with yaws does not accelerate the immunity induced by the primary lesion in the course of an infection, intra-meso-dermal superinfection with yaws, like generalized yaws or vaccine therapy or superinfection with mesodermotropic treponema of syphilis, accelerates the development of immunity to yaws.

H. S. S.

i. SCHÖBL (Otto). **An Interpretation of the Laws of Brown and Pearce that Govern the Course of Treponematoses.**—*Philippine Jl. Sci.* 1931. Oct. Vol. 46. No. 2. pp. 169–175. [7 refs.]

ii. ——. **Coexistent Infection with Yaws and Syphilis.**—pp. 177–181. [3 refs.]

iii. ——. **The Prospects of Vaccination and Vaccine Therapy in Treponematoses.**—*Ibid.* pp. 183–187.

i. The two laws are :—(a) The law of inverse proportions : the more intense the early manifestations the less intense the late manifestations. The author shows that this is true in yaws as in syphilis and interprets

it as expressing a direct proportion between the quantity of treponematous antigen dead or alive and the degree of immunity and spread of its development; (b) The law of sequence: various systems of tissues are affected successively. This law has little application in yaws owing to the epidermotropic tissue selectivity of the parasite. The law in regard to syphilis the author interprets as a successive development of immunity in the various body tissue systems.

ii. A discussion upon homologous and heterologous immunity in yaws and syphilis in relation to the possiblity of the co-existence of both infections in the same animal or person. A reasoned argument against the theory of the unity of the two diseases which cannot be condensed.

iii. The author here discusses the evidence adduced from his experimental production of immunity against yaws and syphilis in animals in order to appraise their value as practical possibilities in the treatment of these diseases in man. He suggests that his findings warrant the belief that inoculation with dead antigen during the early stage of exaggerated tissue reactivity will accelerate the onset of immunity and prevent the occurrence of late lesions and also could be used as a preventive measure.

H. S. S.

MONSERRAT (Carlos). **Comparative Serologic Study of Vernes, Wassermann, and Kahn Reactions in Experimental Treponematoses.**—*Philippine Jl. Sci.* 1931. Oct. Vol. 46. No. 2. pp. 241–246. [3 refs.]

"1. In Philippine monkeys inoculated with yaws or syphilis, the Vernes reaction was found regularly positive.

"2. This fact shows the sensitiveness of the reaction of Vernes, which is a precipitation reaction. It is known that precipitation reactions (Kahn) are not as pronounced in Philippine yaws or syphilitic monkeys as the Wassermann test.

"3. This is particularly evident in sera with a low and a moderate degree of positive reaction, whether compared with Wassermann or Kahn reaction.

"4. Sera from infected Philippine monkeys giving high positive values with Wassermann reaction likewise give high values with Vernes reaction, unlike those with Kahn.

"5. With regard to Philippine monkeys the Vernes reaction seems to have an advantage over both the Wassermann and Kahn tests."

H. S. S.

AARS (Charles G.) & NIELSEN (Frants O.). **The Cholesterol Content of the Blood Serum in Yaws.**—*Arch. Dermat. & Syph.* 1931. Sept. Vol. 24. No. 3. pp. 418–429. With 3 charts. [3 refs.]

ROSEN and KRASNOW using the modified method of Myers and Wardell showed that in syphilis there was a marked tendency to hypocholesteraemia, the lowest values being found in untreated primary syphilis, the highest values in tertiary syphilis.

The present authors using the method of Bloor made a series of determinations of cholesterol in the blood of healthy inhabitants of Dutch Guiana, then among unselected patients and in cases of yaws, mostly children; 4 cases of primary yaws, 53 of secondary and 10 of tertiary disease were examined. 3 were Europeans in the secondary group, the rest were Javanese, British Indians, Negroes and Creoles.

The results resembled the findings in syphilis. During specific treatment with improvement in other directions an increase in the blood cholesterol is observed.

H. S. S.

BUTLER (C. S.). De la tréponématose en marge des rapports du pian et de la syphilis. [**The Relations of Yaws and Syphilis.**]—Reprinted from *Ann. Dermat. et Syph.* 1931. Nov. 7th Ser. Vol. 2. No. 11. pp. 1188–1195.

In this short article, Captain Butler covers the same ground as in other recent notes published elsewhere and noticed in this *Bulletin.*

H. S. S.

GILKS (J. L.). The Incidence and Character of Syphilis and Yaws in Kenya.—*Kenya & East African Med. Jl.* 1931. Aug. Vol. 8. No. 5. pp. 131–142. With 3 charts. [7 refs.]

GILLAN (R. U.). The Treatment of Yaws and Syphilis.—*Kenya & East African Med. Jl.* 1931. Dec. Vol. 8. No. 9. pp. 246–255.

HASSELMANN (C. M.). Yaws and Syphilis. Problems, Clinical Studies and Experimental Evidence concerning their Relationship.—*China Med. Jl.* 1931. Dec. Vol. 45. No. 12. pp. 1131–1155. With 9 figs. on 6 plates. [21 refs.] [St. Luke's Hosp. Dispensary, Manila.]

UNITED STATES NAVAL MEDICAL BULLETIN. 1932. Jan. Vol. 30. No. 1. pp. 62–65.—Controversies on Yaws—Syphilis Relationship and Origin of Syphilis.

A reproduction of a letter of Dr. STANNUS from the *Lancet* and Capt. Butler's comments thereon.

CLIMATIC BUBO AND LYMPHOGRANULOMA INGUINALE.

BUSCHKE (A.), BOAS (A.) & VASARHELYI. Klinische und experimentelle Erfahrungen über Lymphogranuloma inguinale. [**L.I. : Clinical and Experimental.**]—*Med. Klin.* 1931. Oct. 23. Vol. 27. No. 43 (1402). pp. 1562–1565. [7 refs.] [Rudolph Virchow Hosp., Berlin.]

The authors refer to the growing number of cases of L.I. which have come under their observation. They originally published notes on 13 cases; subsequently up to October 1931, 33 other cases were seen. Since that date a further 26 cases have come under their care. They point out the necessity of taking a wide view of this infection; the disease as it used to be known under the name of climatic bubo was too circumscribed in its description. New points come to light and must be noted.

It is agreed that the portal of infection is commonly the genital area, though the inoculatory lesion may not be observed. This lesion has commonly been described as a small herpetiform erosion with no induration and little discharge. It generally heals spontaneously but it may break down again or there may be a true erosive ulcer most often found in the coronal sulcus which will spread on to the inner surface of the prepuce with a certain amount of induration due to lymphatic infiltration. A gangrenous process difficult to control may also occur. In these cases mixed infection with syphilis and phagedaena were naturally considered but bacteriological and serological investiga-

tions were negative, while Frei's reaction was positive. In all their cases the gland involvement was typical, in some retrogression took place spontaneously, in others softening occurred. Among other anomalous cases one is mentioned of a man who 3 weeks after cunnilingus developed two small lesions on the side of the tongue and in 5 weeks an enlarged gland mass in the neck—a case which will be published in full elsewhere. Antigen prepared from the gland gave a positive Frei reaction in the patient himself and other cases of L.I.; controls being negative. Other extragenital infections have been noticed by KLOTZ, HELLERSTRÖM and FAVRE.

The disease must be regarded as a truly general infection; generalized symptoms are not uncommon; there is prolonged fever, enlargement of the liver and spleen, rheumatic manifestations and exanthems resembling erythema nodosum and erythema exudativum multiforme, as noted by HELLERSTRÖM, FREI, KLEEBERG and KITCHEVATZ. KLEEBERG found that extracts made from the skin efflorescence would give positive skin reactions.

A case is detailed of a man seen 5 weeks after coitus suffering with fever and enlargement of groin glands for 3 weeks. There was a discharge from the urethra (as in CURTH's case, urethral lesion) but W.R., Dmelcos reaction and examination for gonorrhoea were negative while Frei's test was stongly positive. The case ran a long course; in the second month, there were acute abdominal symptoms—constipation, pain and tenderness, leucopenia, albuminuria and a secondary anaemia associated with a large mass of glands in the lower abdomen. Later, knee and shoulder joints and joints of hands and feet were swollen and slightly reddened with pain on movement and further rise in temperature; both shins showed typical erythema nodosum. The iliac glands were more greatly swollen, the spleen enlarged, and on the neck a papulo-macular rash appeared with bleb formation. In this case of generalized disease detoxin given intravenously was followed by rapid improvement in all signs and symptoms.

Another case worthy of note was one of obvious syphilis. Spirochaetes were found and the W.R. was positive. Dmelcos test was negative as also was the Frei reaction. Later the groin glands swelled and the Frei reaction became positive.

The results of animal inoculations from some of their cases are given but need no mention here.

H. S. Stannus.

NICOLAU (C. T.). Modifications hématologique dans le lymphogranulome inguinal bénigne (maladie de Nicolas et Favre). [**Blood Changes in L.I.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Bucarest.* 1931. Apr. Vol. 13. No. 4. pp. 45–50. With 2 charts in text. [2nd Med. Clinic, Faculty of Med., Bucharest.]

After briefly referring to the clinical picture of L.I. in its acute form and in the form with more gradual onset and to the findings of others in regard to the blood formula, the author gives the results of his own observations upon forty cases in which the diagnosis was confirmed by the intracuti-reaction of Frei.

There is a leucocytosis varying from 8,000 to 27,000, which apparently has no relationship with the temperature or other clinical manifestations. The differential white count varies a good deal, corresponding with the reactions between antigen and the tissues. The counts represent a series of events in the evolution of the inflammatory process: period of attack, neutrophilia; of defence, eosinophilia and monocytosis; or

cure, lymphocytosis. The sedimentation test showed marked acceleration in all cases. The refraction index of the serum is raised—55–72.

H. S. S.

i. MEYER (Kurt); ROSENFELD (Herbert); ANDERS (H. E.). Erfolgreiche Übertragung des Lymphogranuloma inguinale auf Meerschweinchen. I. Experimenteller Teil [MEYER & ROSENFELD].—*Klin. Woch.* 1931. Sept. 5. Vol. 10. No. 36. pp. 1653–1655. II. Ueber Histogenese und Pathogenese des auf das Meerschweinchen uebertragenen Lymphogranuloma inguinale [ANDERS].—*Ibid.* pp. 1655–1658. With 4 text figs. [10 refs.] [Rudolf Virchow Hosp., Berlin.]

ii. FREUND (Helmut) & REISS (Franklin). Übertragung des Lymphogranuloma inguinale (Nicolas-Favresche Krankheit) auf Kaninchen und Meerschweinchen. [**Transmission of L.I. to Guineapigs and Rabbits.**]—*Ibid.* pp. 1658–1659. [7 refs.] [Skin Clinic, Univ., Berlin.]

i. The authors record constant successes in inoculation of guineapigs with pus in 0·5 to 1·0 cc. doses from cases of L.I. injected into the inguinal region after subjecting the local lymphatic glands to bruising. In 48 hours some induration can be felt, in 10 days a lesion the size of a cherry; this later diminishes leaving only a small pea-sized hard gland. If the animal be killed 8–10 days after inoculation periglandular haemorrhagic infiltration is revealed and sometimes necrosis or caseation in the gland. If it is killed later, an extension of the process is observed, the iliac glands are affected on the same side and the mesenteric glands may be involved, with caseation in some cases. The spleen may be enlarged and the liver and lungs also affected, showing macroscopically small infiltrations white in colour and the size of a pin's head.

The histological changes, dealt with at length by H. E. Anders, resemble those of the human disease, and are characteristic. From nine out of ten cases of L.I. successful inoculations were made into nineteen out of twenty-two guineapigs.

Subinoculations on ten occasions were all successful and third passages were obtained. Extracts of liver and lung were used in some cases as the inoculum. One strain was carried through twelve successive animals, but there is some evidence that subinoculation is accompanied by decreasing virulence. The virus in preliminary experiments was shown to be a filter-passer and to be resistant to heat and glycerine. All the original patients gave positive skin reactions to antigen prepared from the tissues of the infected animals.

ii. Successful results have followed subdural inoculation of rabbits with material from cases of L.I. There is produced a characteristic meningo-encepalitis, that can be passaged from one animal to another, an extract of brain substance from an infected animal producing lymphatic changes in a second animal when inoculated as easily as when the inoculum consists of pus from a case of L.I. Inoculation into a gland of gland or brain extract from an infected animal produces clinical, histological and biological results comparable to inoculation of human material.

The disease can be subinoculated into guineapigs from rabbits and vice versa or from one animal to another of the same species.

H. S. S.

HELLERSTRÖM (Sven). Experimentelle Untersuchungen über Lymphogranuloma inguinale. [**Experimental Researches on L.I.**]—Reprinted from *Dermat. Ztschr.* 1931. Vol. 61. pp. 395–399.

Numbers of observers have in the past described organisms as possible etiological factors in L.I. but they have all been discredited. In the same way many attempts to infect animals failed. A change in technique however, was followed by success; the disease can be carried on in monkeys by intracerebral injection. In the monkey intracerebrally inoculated with gland juice from a case of human L.I. a characteristic leptomeningitis with polymorph, endothelial and plasma cell infiltration is produced. In some animals the disease is a rapidly fatal one, in others it is more chronic and in some no symptoms occur. If the last mentioned be killed the characteristic change will still be found. No organisms can be discovered but the disease can be passaged in monkeys and has thus been propagated up to the 15th passage. An antigen prepared from the brain and meninges of these monkeys gives a positive Frei cuti-reaction in human cases of the disease, all controls being negative. A few animals have apparently survived the disease and become reinoculable. These results were communicated at the Dermatological Congress at Copenhagen. LEVADITI and others have had similar results and all go to show that L.I. is due to a virus which can be obtained from the affected glands in human patients and communicated to monkeys. Hellerström and WASSÈN continuing their investigations have shown that in material kept in sterile glycerine up to seven days the virus may remain active but after that period virulence disappears. Any influence the pH may have has not been worked out. In one out of a few experiments a Berkefeld filtrate gave a positive result but the filtrability of the virus is not yet properly established; results, however, suggest an ultramicroscopic virus comparable with other ultramicroscopic viruses.

As regards treatment, in a single case the antigen of Frei was used, in a 1 in 8 dilution heated to 60° C. and with 0·5 per cent. added phenol; 0·2 to 5·0 cc. given intravenously every day and later every second day was well supported and noticeable improvement occurred in a week.

H. S. S.

i. LEVADITI (C.), MARIE (A.) & LÉPINE (P.). Conservation de la virulence du virus lymphogranulomateux.—*C.R. Soc. Biol.* 1931. Sept. 18. Vol. 107. No. 26. pp. 1496–1497. [3 refs.]

ii. ——, RAVAUT (P.), LÉPINE (P.) & SCHOEN (R.). Etude expérimentale du virus de la lymphogranulomatose inguinale. [**Study of the Virus of L.I.: its Preservation.**]—*Ibid.* pp. 1525–1527. With 1 chart in text. [2 refs.]

i. The authors considered it would be interesting to ascertain whether the virus of L.I. (which has been shown by HELLERSTRÖM and WASSÈN to affect the central nervous system in monkeys) might have a possible therapeutic effect in cases of general paralysis, especially those which are refractory to other therapeutic infections.

A 35 year old case of typical G.P.I., resistent to malarial infection, was inoculated (5th June) intradermally, on the inner surface of the prepuce with 0·1 cc. of a brain emulsion from a cynocephalus monkey which had died on the seventh day after transcranial inoculation with the "Kam" strain of virus at its 12th passage through monkeys. After

an incubation period of 35 days, during which there was nothing to record, typical swelling of the inguinal glands became evident. The virus therefore of L.I. preserves its virulence for man after 12 passages through monkeys inoculated intracerebrally. Further results will be reported in due course.

ii. During the routine experiments made upon the infection with the virus of L.I. in monkeys, the following observations have been made. *Macacus cynomolgus*, *M. inuus*, *Cercopithecus callitrix* [? *callitrichus*] and *Cynocephalus babuin* are all susceptible, more especially the last mentioned. Death ensues between the 5th and 26th days, more generally between the 5th and 12th days. The virus rapidly loses its pathogenicity outside the body, as when fragments of brain tissue are kept in glycerine at 2° C. Simply kept in an ice chest the maximum preservation of pathogenicity is ten days. Dried virus cannot be preserved any longer time. Intracerebral inoculation of the white mouse induces no clinical disease in that animal but if it is killed pathological changes resembling those found in monkeys may be demonstrated and intracerebral inoculation of a monkey with an emulsion of the brain of a mouse killed on the 5th day caused infection of the monkey. (In a later experiment it was shown that the virus remained active in the white mouse up to 22 days.) Experiments were carried out to determine whether neutralization of the virus of L.I. can be effected. It was found that the serum from a human patient who had been suffering from the disease for several months was capable of neutralizing the virus *in vitro* and that all controls were negative.

H. S. S.

LEVADITI (C.), RAVAUT (P.), LÉPINE (P.) & SCHOEN (R.). Etude étiologique et pathogénique de la maladie de Nicolas et Favre (lymphogranulomatose inguinale subaigue, ulcère vénérien adénogène, poradénolymphite). [**Etiological and Pathological Study of L.I.**]—*Ann. Inst. Pasteur.* 1932. Jan. Vol. 48. No. 1. pp. 27–88. With 7 coloured figs. on 1 double plate, 27 figs. & 1 chart. [Refs. in footnotes.]

This contribution, by Levaditi and his co-workers, forms almost a monograph upon the nature of the virus, the pathogeny, the histo-pathological findings in man and experimental animals and the virucidal properties developed in the serum. It is impossible to summarize and should be read by all those interested in the disease.

H. S. S.

LEVADITI (C.), RAVAUT (P.), LÉPINE (P.) & CACHERA (R.). Propriétés virulicides du sérum de sujets atteints de la maladie de Nicolas et Favre. [**Virucidal Properties of the Serum of L.I. Patients.**]—*Bull. Acad. Méd.* 1932. Jan. 26. 96th Year. 3rd Ser. Vol. 107. No. 4. pp. 110–114. [2 refs.]

Recently the authors showed that the serum of a patient suffering from L.I. would neutralize *in vitro* the ultra-virus of that disease. The problem of determining the time at and the quantity in which these virulicidal substances appear in the blood was next entertained. Mixtures of patients' serum and emulsion of brain from an infected monkey were prepared with a like number of controls, the test being made by intracerebral injection of the mixture into clean monkeys.

It was shown that the serum of L.I. patients contains specific virucidal substances capable of neutralizing *in vitro* the L.I. virus and that these substances seem to appear in the blood little after the onset of signs of infection in man.

H. S. S.

SULZBERGER (Marion B.); DAVID (Vernon C.). **Stricture of the Rectum.** [Correspondence.]—*Jl. Amer. Med. Assoc.* 1932. Feb. 6. Vol. 98. No. 6. p. 499.

Dr. Sulzberger refers to an article by DAVID and LAUER (*Jl. Amer. Med. Assoc.* 1932, Jan. 2, Vol. 98, No. 1, p. 1) upon some unusual causes of stricture of the rectum in which it was shown that there are a large number of such cases of uncertain aetiology and that though some 50 per cent. of such cases give a positive W.R. especially in negro women, other cases seen in white women have shown no evidence of syphilis. The writer then suggests that these cases probably are cases of lymphogranuloma inguinale analogous to those described by SULZBERGER and WOLF (in the *Brit. Jl. Dermat.*, now in print) such lesions being often the only clinical manifestations of the disease in women. This condition, that known as esthiomene or ulcus vulvae chronicum elephantiasticum and syphiloma anorectale generally found in women, together with elephantiasis of the penis and scrotum, all give a positive reaction with Frei's antigen. Dr. David replying states that he has seen superficial ulceration of the mucosa of the rectum as the earliest stage of the process and no enlargement of lymph glands, also ulceration of colon above a colostomy done for stricture without glandular enlargement or evidence of lymphangitis which Sulzberger has suggested was the cause of the stricture, a lymphangitis spreading from cervix and fornices along perirectal lymphatics.

H. S. S.

HELLERSTRÖM (Sven). Strumöse Bubonen verschiedener Ätiologie. [**Strumous Buboes of Various Aetiology.**]—Reprinted from *Acta Dermato- Venereologica.* 1931. Aug. Vol. 12. No. 3. pp. 254–276. With 5 text figs. [22 refs.] [Karolin Inst., Stockholm.]

The author draws attention to the difficulties in the differential diagnosis between L.I. and other types of strumous bubo due to spirochaetal, streptobacillary and staphylococcal infections, and to this end discusses cases, their histories and histological findings.

H. S. S.

BENSAUDE (R.) & LAMBLING (A.). Le rôle de la maladie de Nicolas-Favre dans l'étiologie du rétrécissement inflammatoire du rectum. Etude de 21 cas par l'intra-dermoréaction de Frei.—*C.R. Soc. Biol.* 1931. Dec. 18. Vol. 108. No. 37. pp. 1050–1053. [1 ref.]

GRANULOMA VENEREUM.

DE MONBREUN (William A.) & GOODPASTURE (Ernest W.). **Etiological Studies of Granuloma inguinale.**—*Southern Med. Jl.* 1931. July. Vol. 24. No. 7. pp. 588–596. With 24 figs. on 4 plates. [13 refs.] [Med. School, Vanderbilt Univ., Nashville, Tenn.]

During the past fifteen months cultures on a great variety of media have been made from six cases of granuloma inguinale in negroes, mostly women, in an endeavour to find and prove the causative

organism. In none did the authors succeed in growing an organism of the mucosus capsulatus group, or one possessing the characteristics of the Donovan body nor, regularly, any other organism. One resembling Ducrey's bacillus in many respects in association with a streptococcus was found in three cases. Attempts to infect animals by inoculations of scrapings from lesions must be looked upon as failures, except in the case of some monkeys, in whom the authors claim that "the great number of Donovan organisms present in mononuclear cells within the lesions [injection induration] and especially their arrangement in cysts corresponding in every way to those of the human cells," prove infection to have taken place with multiplication of the organism —which they consider to be the cause of G.I.

H. S. Stannus.

WILSON (Lester A.). **Pregnancy and Labor complicated by Granuloma inguinale.**—*Jl. Amer. Med. Assoc.* 1930. Oct. 11. Vol. 95. No. 15. pp. 1093–1094. With 1 text fig. [2 refs.]

Dr. Wilson, professor of obstetrics, Charleston, South Carolina, gives short notes upon 14 cases of negro women met with in five years suffering from G.I. complicating pregnancy and confinement. Three of these gave a positive blood W.R. The condition was progressively worse during the pregnancy and improved again after labour. Interference was minimal and no vaginal examinations were made, with the result that septic trouble in the puerperium was conspicuously absent.

[It is stated that the usual intravenous injections of tartar emetic were given when the patients were seen during the pregnancy but the results of such treatment are not mentioned. The fact of these women having become pregnant is of interest since it has been stated in some text books that they are rendered sterile.]

The author is of opinion that the disease is not capable of venereal transmission for none of the husbands of these 14 women was affecte .

H. S. S.

SILVA (Flaviano). Localização extragenital do granuloma venereo. [**Extra-genital Granuloma venereum.**]—*Brasil-Medico.* 193 . Aug. 15. Vol. 45. No. 33. pp. 749–750.

The author refers to cases of granuloma venereum extragenitally situated previously reported by MAITLAND in Madras, and by DONOVAN, SUTTON, SEQUEIRA and others. In Brazil PEDROSO has recorded it on the lip, LUTZ and SANSON in the mouth, Silva ARAUJO on lip and cheek, and MARINHO on the soft palate.

He gives details of a patient who for 12 years had a lesion on the pubes and the genitalia. It had been treated repeatedly by injections of antimony, but had not completely healed. In addition there was a granulomatous lesion of the gum on the right side involving also the soft palate and uvula. Microscopical examination of a fragment of the latter showed *Calymmatobacterium granulomatis.* The teeth were carious and the patient had a habit of inserting his fingers in his mouth to feel them, and it is thought that infection was thus conveyed. [The later history of the case is not stated.]

H. H. S.

GREENWOOD (F. G.). **The Treatment of Granuloma Inguinale by Diathermic Fulguration. An Analysis of Twenty-Two Cases.**—*Brit. Jl. Radiology.* 1931. Oct. Vol. 4. No. 46. pp. 488–499. With 2 figs. on 1 plate. [14 refs.]

During the three years 1927–29 some 20 cases of granuloma inguinale in the Federated Malay States were treated by fulguration (details of which are given). From 1–4 courses were necessary given under general anaesthesia and the average duration of treatment was seventy days. The immediate results are good but the late results unknown as it was impossible to follow cases.

[The author, it should be noted, makes the curious mistake of not differentiating Leishman-Donovan bodies of the leishmaniases and the so-called Donovan organism which has been found in the inguinal granulomas now being dealt with.]

H. S. S.

DEMONBREUN (W. A.) & GOODPASTURE (E. W.). **Infection of Monkeys with Donovan Organisms by Injections of Tissue from Human Lesions of Granuloma inguinale.**—*Amer. Jl. Trop. Med.* 1931. Sept. Vol. 11. No. 5. pp. 311–323. With 7 figs. on 3 plates. [3 refs.] [Med. School, Vanderbilt Univ., Nashville, Tenn.]

Granuloma inguinale is generally considered to be a venereal disease but extragenital infections are not uncommon. There is an interesting racial and individual immunity. Whites very seldom contract the disease and negroes, among whom most cases have been observed, may escape infection even after repeated exposure. In this connexion it is pointed out that the supposed infective agent, the Donovan organism, seems to multiply mainly within the cells of the host, and the possibility of an insect vector should not be lost sight of. The variable incubation period of 2 days to 3 months is also a point against sexual transmission. Histological examination shows that proliferation of granulation tissue takes place in the subcutaneous fat. It is suggested that occasionally in acute cases the Donovan organism may be carried by mononuclear cells into the blood stream to cause metastasis and this accounts possibly for peculiar extragenital localizations. Many organisms have been obtained in culture from G.I. but inoculations into animals have always failed to reproduce the lesions. Subcutaneous inoculation of laboratory animals with scrapings from human lesions resulted in localized abscesses from which Donovan organisms were never recovered.

Success has, however, been now obtained. A saline suspension of scrapings from a human lesion shown to be rich in Donovan organisms and but few others was inoculated subcutaneously into the skin of the lower eyelid of *Macacus rhesus* monkeys and the inoculation repeated 4 times in 24 days. Smears made of material aspirated from the lesions resulting from inoculation showed numerous large mononuclear cells containing cysts filled with the bacillary form of the Donovan organism with some encapsulated organisms. The lesions had completely disappeared 2 months after the last inoculation.

The authors believe they have established infection in 3 out of 5 monkeys as shown by the multiplication of the organisms and their arrangement in cysts corresponding to that seen in human lesions and pointing to multiplication.

H. S. S.

MISCELLANEOUS.

McCarrison (R.). **Experimental Production of Gastric Ulcer in Albino Rats. (A Preliminary Report.)**—*Indian Jl. Med. Res.* 1931. July. Vol. 19. No. 1. pp. 61–66. [Nutritional Research Labs., I.R.F.A., Coonoor.]

Gastric and duodenal ulcers are extremely common in Southern India; hundreds of surgical operations are performed annually for their relief. Dr. Somervell of the South Travancore Medical Mission is convinced that the tapioca diet of that district is related causally to the disease. Experiments were therefore made on albino rats. The average ration of a subject with duodenal ulcer in South Travancore consists of 2½ to 4½ lbs. of tapioca with red chillies, tamarind, rice water, fish once a day and occasionally meat. A similar diet was given to 18 young rats, and another with rice replacing the tapioca to another 18 rats. Both batches were observed for 675 days. The results were as follows:

In both groups the mortality was high, pneumonia being the chief cause of death. The growth in both groups was poor. Eight out of 17 animals on the tapioca diet, and six out of 17 on the rice diet were found post-mortem to have lesions of the stomach.

"Those fed on the tapioca diet were more subject to congestion of the stomach and to gastritis: both were liable to epithelial overgrowths at isolated areas in the proximal or squamous portion of the stomach and to ulceration of this part of the viscus. Those fed on the tapioca diet were definitely more liable to ulceration of the distal or mucous portion of the stomach. In neither did duodenal ulcer occur, though two of those fed on the 'tapioca diet' and one fed on the 'rice diet' were found at post-mortem examination to have duodenitis."

The gastric ulcers are described.

Conclusion:

"Both the 'tapioca diet,' eaten by the people of South Travancore, and the 'rice diet,' which is similar in composition to that eaten by many people in the Madras Presidency, are capable of causing gastric ulcer in albino rats. The tapioca diet is the worst of the two."

[See this *Bulletin*, Vol. 28, p. 860, where gastric ulcer in Abyssinia is attributed partly to the free use of chillies.]

A. G. B.

Frobisher (Martin), Jr. & Shannon (Raymond C.). **The Effects of Certain Poisons upon Mosquito Larvae.**—*Amer. Jl. Hyg.* 1931. Mar. Vol. 13. No. 2. pp. 614–622. [4 refs.] [Yellow Fever Lab., Rockefeller Foundation, Bahia, Brazil.]

Iodine killed the larvae of *Aedes aegypti*, *A. taeniorhynchus* and *Cules quinquefasciatus*, in concentrations of about one part per million, within four days. Pupae are more resistant. The general use of iodine in drinking waters is not at present recommended owing to difficulties in applying the exact concentration required, and because of possible bad effects upon the consumers; but for other water in cisterns, tanks, etc., where a transitory action is required, it may be advantageous.

W. Fletcher.

GALLIARD (H.). Infections mixtes à tréponèmes et à trypanosomes chez les animaux splénectomisés. [**Mixed Infections with Treponemas and Trypanosomes in Splenectomized Animals.**]—*C.R. Soc. Biol.* 1931. July 21. Vol. 107. No. 24. pp. 1282–1284.

The trypanosomes were *T. somaliense ;* the spirochaetes *Sp. hispanica, Sp. crocidurae, Sp. duttoni,* which are only slightly pathogenic for mice. The conclusions reached were that mixed infection in splenectomized animals is little modified in duration or development except in the case of virulent spirochaetes. The antagonistic action of the spirochaetes is not reinforced. Survival is shorter if the operation on the animal was recent or took place immediately after inoculation. If however, the ablation of the spleen is remote, the resistance of the mice to the mixed virus seems to be in some degree stronger than in the controls.

A. G. B.

O'CONNOR (F. W.). Tropical Diseases and Parasitic Infections in New York City.—*Bull. New York Acad. Med.* 1931. Sept. Vol. 7. No. 9. pp. 747–750.

PITOT. La pyorrhée alvéolaire en Afrique.—*Bull. Méd. du Katanga.* 1931. Vol. 8. No. 2. pp. 33–35.

TOMS (H. W.). European Women and Children in the Tropics. [Correspondence.]—*Brit. Med. Jl.* 1931. June 20. pp. 1091–1092.

REVIEWS AND NOTICES.

MENON (T. Bhaskara) [M.D., M.R.C.P., etc.]. **An Introduction to Tropical Pathology.** With a Foreword by Major-General C. A. SPRAWSON, C.I.E., V.H.S., M.D., F.R.C.P., LL.D., I.M.S., etc.—pp. xvi+210. With 71 figs. 1931. Calcutta: Thacker's Press & Directories, Ltd. [Rs. 10s.]

This book should serve a very useful purpose. As the title indicates, it is an *Introduction* and it is designed primarily to meet the needs of the undergraduate student in the tropics. In its nature, therefore, it has to contain many statements which are dogmatic, but in an introductory book this is both necessary and advisable, for when the ground work is well and truly laid anomalies met with later are more likely to be recognized promptly and lead to deeper research.

Symptoms and signs of disease are, intentionally, barely touched upon. Misprints are every few (Oxuris is one) but two or three corrections will need to be made in nomenclature in future editions. Thus, there is evidence in favour of both *Spirochaeta pallida* and *Treponema pallidum* for the organism of syphilis, but Treponema pallida cannot stand; the usual name for the infective agent of seven-day fever is *L. hebdomadis*; again, Bacillus typhus exanthemetici is, apart from accidence run wild, not a valid synonym of *Proteus X 19* or *P. vulgaris X 19*; Schistosoma is preferable to Schistosomum (if Bilharzia, with legitimate priority, is not adopted) and Fasciola hepaticum is a false concord.

The penultimate chapter, Appendix I, on important laboratory methods is good, as is the last, Appendix II, with hints on performing post mortem examinations in the tropics; the former of these might be enlarged with advantage. It is a little misleading to state (p. 39) "The disease has no pathologic anatomy since it is not fatal"; has an ordinary dry pleurisy, a fractured leg or even coryza, no pathologic anatomy?

The print is good, the plates and illustrations in general are excellent. In short, the book is a good and trustworthy one within the limits which the author himself imposes, but a list of contents does not adequately compensate the omission of an Index.

H. H. S.

ALESSANDRINI (A.), PAMPANA (E.) & SABATUCCI (M.). **Gli esami di laboratorio. Tecnica e diagnostica.** [Laboratory Examinations.]—pp. xxxii+635. With 89 text figs. (5 coloured) & 3 coloured plates. 1932. Rome: Casa Editrice Luigi Pozzi. [L.50].

This book merits high praise. The task which the authors set themselves was to describe the technique of methods in general use in laboratories, not to write a manual for beginners nor to enter upon matters of mere theoretical value. They presuppose a knowledge of the elements of laboratory work and confine themselves to methods of proved utility as now in use at the Istituto di Igiene di Roma, though these are, to all intents and purposes, the same as those at most laboratories of repute.

An enumeration of the chief subjects will indicate the extensive field which is covered: Preparation of solutions of desired strength; examination of blood—cytological, parasitological, bacteriological, chemical and serological—preceded by hints for taking samples; similarly of the cerebrospinal fluid; examination of excreta, gastric contents, sputum and exudates; bacteriological diagnosis, isolation of organism, interpretation of results; protozoological, helminthological and entomological technique; skin reactions—tuberculin, Dick, Schick, melitene, echinococcus tests; preparation of vaccines, of pathological material for section; examination of water and of milk.

The reviewer has been through the book page by page and tested it again

and again, but has rarely failed to find the information sought. That it is up to date is shown by the inclusion of such matters as the Takata-Ara reaction in cerebrospinal fluid and the medico-legal application of blood-grouping; hence it is all the more strange to find no mention of trypanosomes either in blood or spinal fluid examination, nor of the Lange colloidal gold test. For hookworm culture in faeces the messy charcoal method is given; too great stress would seem to be laid on examination of the hippocampus in rabies; the reviewer used to find Negri bodies equally well in the cerebellum, pons or medulla, both in natural and experimental infection. It is only natural, perhaps, in an Italian work to find greater prominence given to and more reliance placed on non-specific agglutination and the work of ALESSANDRINI and FICAI for distinguishing *Br. melitensis* from *Br. abortus* than in English works. The entomological section is the weakest and that on water examination is sketchy, while the fluorescin and suchlike tests for leaking wells and drains hardly come under the term of laboratory examination.

In conclusion, we may say that the work is on the whole adequate, and there is no redundancy; it is eminently practical, well illustrated, handy and light to hold; it should meet with a welcome reception.

H. H. S.

LLOYD (Wray). **The Myocardium in Yellow Fever.**—*Univ. of Toronto Studies. Path. Ser. No. 8.* 172 pp. With 42 figs. (8 on plates). 1931. The University of Toronto Press.

This thesis presents in an interesting and closely reasoned manner the pathogeny and pathology of a most intriguing study—to determine the cause of bradycardia in yellow fever and to trace the significance and constancy of the degenerative myocardial lesions. Nearly all writers of theses at the present day appear to feel it incumbent upon them to give a historical introduction, which is rarely relevant. Thus whether the disease which wrought such havoc among Roman and Carthaginian troops in the 3rd century B.C., or among the Greeks in the 5th century B.C. was yellow fever or not is pure guess work and has nothing to do with the pathology of the myocardium.

The author considers first the clinical condition of the heart, familiar to all who have seen cases of this disease. The succeeding section is of the utmost interest and will well repay study; it deals with the myocardial function, describing the technical methods employed, physiological observations on the sino-atrial node and the vagus, and then on the auricular muscle and auriculo-ventricular bundle and the ventricular muscle, illustrated by series of very instructive electrocardiographic tracings. Part IV takes up the histological structure of the myocardium in the same sequence. Having thus laid the foundation the author proceeds to correlate the change and defects of function with the structural alterations revealed and finally sums up his conclusions.

In the earliest stages with the first rise of temperature the heart-beat may be increased, but very soon it begins to slow down, the muscular sounds are fainter than usual and changes registrable by the cardiograph appear; these are due to the effect of the circulating toxins on the cardiac musculature and injury to the sino-atrial node. Damage to the auricular muscle is evidenced by an inverted or reduplicated P wave; there is delay in transmission of the impulse from auricle to ventricle and degenerative changes are occurring in the auriculo-ventricular bundle. On the third and fourth days, the times when death most often takes place, the signs of deranged function are more marked. If recovery is going to ensue these signs retrogress, the P–R and R–T intervals in the electrocardiogram become longer and the conduction time begins to return to the normal. In short, the constant bradycardia is ascribable to degeneration in the sino-atrial node; abnormalities in the P wave to degeneration in the

auricular muscle ; the prolongation of conduction time of the impulse from auricle to ventricle to degeneration in the auriculo-ventricular bundle.

In animals dead of the infection well marked degenerative changes are seen in these structures and fatty degeneration, patchy, irregularly distributed, and varying in degree, is present in the muscle fibres; granular degeneration is also fairly common, hyaline less so. Small petechial haemorrhages may be seen [probably part of the wide spread petechial rash which may occur, due to endothelial changes and diapedesis.]

Eight microphotographs show, as well as such a process is capable, the outstanding histological features described, and there is a comprehensive bibliography of over 700 titles. The whole is a painstaking study of an important subject, carefully executed.

H. H. S.

McDowall (Robert John Stewart) [D.Sc., M.B., F.R.C.P. (Edin.), Professor of Physiology, King's College, University of London, etc.] **The Science of Signs and Symptoms in Relation to Modern Diagnosis and Treatment. A Textbook for General Practitioners of Medicine.**—pp. viii+440. With 7 figs. 1931. London: William Heinemann (Medical Books) Ltd., 99, Great Russell Street, W.C.1. [21s.]

This book is reviewed in *Bulletin of Hygiene,* 1932, Vol. 7, p. 195.